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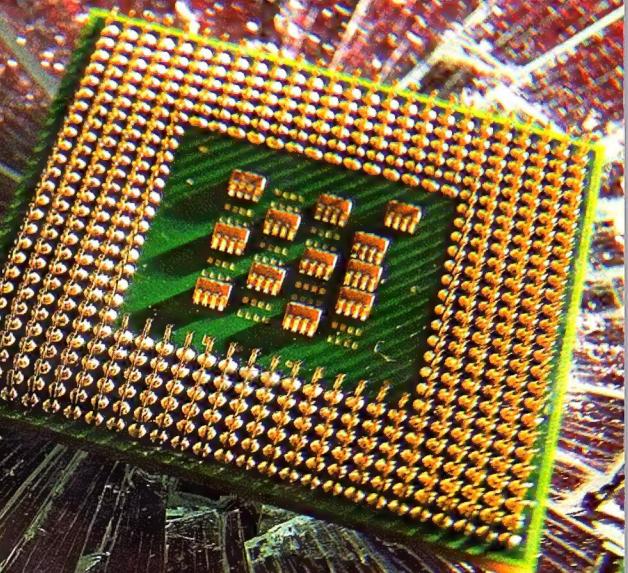
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tweaknews.com



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"In our tests, the PQI3200-1024DBUs turned out terrific performance along with impressive overclocking results....to top it off they're priced to sell!"

hothardware.com

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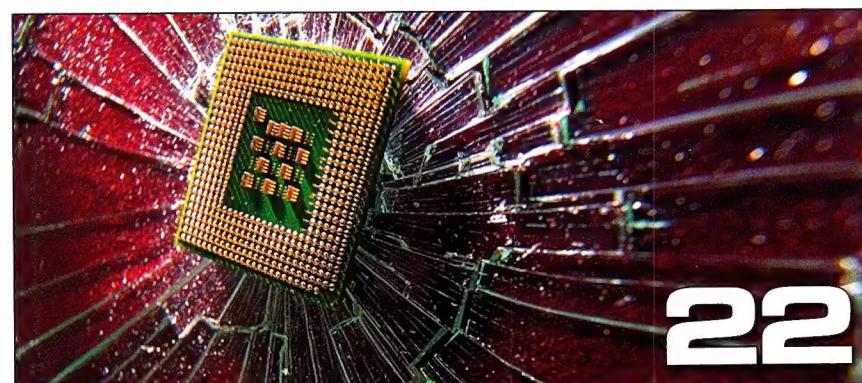
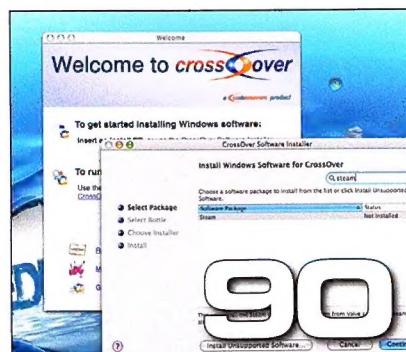
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EDHEAD

Beware of glass

I've never intentionally broken a piece of glass before.

Opportunity has been, and is, everywhere. As a kid, I didn't once whack a cricket ball into my neighbour's awaiting kitchen window. Nor have I accidentally run full pelt into a glass door. I've even managed to resist the temptation of busting the glass on those fire alarm buttons, despite the words printed on them urging me to do so.

So what compelled me to smash some for our cover? Nothing, actually, considering it was the lovely work of Sam, our creative director.

Despite expecting the worst, a garden-variety hammer, bit of cloth and boring thud later the job was done. No bleeding or bizarre deaths, just the amazing photo you see on the cover.

Anyway, the image and the story came together well, and you can read all about it starting on page 22. If you have absolutely no idea what it's about, Tim Dean goes over the finer details of Intel's failure to make the 10GHz CPU a reality. He explains what went wrong, the technical challenges, and what to expect in the future.

Next up is our World of Warcraft UI modding guide. A great deal of customisation is available to those really dedicated, as long as you're willing to



have a fiddle. We detail the best UI mods, catering for the raider, player versus player combatant and those in-between. There's loads of info on those eight pages, and you can get into by turning to page 30.

Craig once again delivers on the hardware front with a comprehensive look at the latest Core 2 motherboards. Spending days at a time in labs, Craig put each board through a rigorous set of overclocking benchmarks, and pages 42 to 49 hold the results.

Engine Room is home to a great technical piece on EA Los Angeles' upcoming Command & Conquer 3. It's still based on SAGE, the engine used in C&C Generals, but you wouldn't be able to tell that looking at what they've done. Shader Model 3.0, specular mapping – it may as well be next-gen. All the specifics on the tweaks and improvements can be found beginning on page 68.

Luke 'Defyant' St Clair also found time to build yet another game-themed case for us (and a lucky winner), this time, based on Supreme Commander. Honestly, the man is a case-modding God.

Incidentally, Supreme Commander is reviewed this issue on pages 74 and 75.

There's heaps more, and, depending on your definition of a 'heap' (I imagine a giant, sky-scraping pile of candy flanked by Jessica Alba clones, but your mileage/hot superstar may vary) should entertain for hours. Months even if you read a single word a day.

Logan Booker

ibooker@atomicmpc.com.au

Atomic 72 winners: 5x Star Wars: Best of PC - V. Cassisi, Merrylands, Sydney NSW; B. Dunn, Geelong North VIC; C. Penco, Morwell VIC; F. Theliani, Fairfield NSW; C. Thompson, Manoora QLD; 10x ZBoard Fangs - K. Atkinson, Hervey Bay QLD; K. Crocker, Berala NSW; M. Freer, Springfield NSW; C. Hernandez, Gordon NSW; T. Millerehip, Edmondson Park NSW; K. Sandianti, Morayfield QLD; L. Steabben, Edithvale VIC; D. Turner, Brisbane QLD; M. Wakefield, Bridgeman Downs QLD; S. Young, Hampton VIC; 10x NWN2 game and T-shirt - J. Broxson, West End QLD; R. Buesselmann, Gladstone Park VIC; I. Finck, Potts Point NSW; C. Mabee, North Ryde NSW; G. Reynolds, Eastern Heights QLD; 1x Albatron 8800GTX - A. Andrews, Eltham VIC; 1x Albatron 8800GTS - H. Leung, West Pymble NSW; 22x i-Rocks speakers - A. Band, Davidson NSW; M. Bettone, North Ryde NSW; C. Blake, Penola SA; S. Djani, St Ives NSW; A. Gaudry, Casula NSW; E. Gould, Jabiru NT; P. Gregory, Brighton QLD; N. Griffith, Springfield NSW; C. Harrison, Watsonia VIC; R. Heron, Tugun QLD; L. Kay, Leanyer NT; K. Kelling, Nerang QLD; J. Kinsella, Warwick WA; E. Kiraly, Bundaberg QLD; M. Kitching, Ballajura WA; R. Leadbeater, Mount Ommaney NSW; T. Nagy, Redwood Park SA; K. Pruessner, Wattle Glen VIC; K. Regan, Toowoomba QLD; K. Sharpe, Warwick QLD; M. Smolders, Joondalup WA; R. Yap, Point Clare NSW.

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CES, one show to rule them all. Source: CEA

“ It was all about full HD, and a host of vendors were scrambling to show off their latest models. ”

No big releases from ATI or NVIDIA, but ASUS impressed with its innovative external graphics card for notebooks. It connects via ExpressCard and houses PCI Express graphics and sound, lending notebooks additional gaming clout.

On the storage front Hitachi upped the ante with its 1TB SATA hard drive, while SanDisk talked up its prototype 32GB flash-based hard drive – with bigger capacities to come. USB flash drives and memory cards are also inflating, with devices up to 8GB now available.

The Xbox 360 proved itself a flexible little addition to the living room. On top of its gaming capabilities, Microsoft demoed its Media Extender functionality, the external HD-DVD drive, and the TV and movie downloads through Xbox Live, as well as announcing upcoming IPTV services.

Mobility was another big theme of CES 2007. Mobile phones of every size, shape and colour were on show, including models with touchscreen interfaces (like the iPhone), fold out keyboards, e-ink displays and all manner of folding/sliding/flipping designs.

Finally, among the gadgets the clear highlights were the plethora of robots – from Honda's ASIMO to a singing robot Elvis head, and the full size R2-D2 Mobile Entertainment Station from Nikko Home Electronics, with iPod dock, integrated projector and remote control shaped like the Millennium Falcon.

CES 2007: The cool bits

Tim Dean surveys the latest and greatest at the 2007 Consumer Electronics Show.

High definition was the catch cry of CES 2007, and not just the 720p we've been experiencing in recent years. This year it was all about full HD, 1080p (1920x1080), and a host of vendors were scrambling to show off their latest models in both plasma and LCD flavours. Evidently size also matters, with LG and Panasonic showing off 100in+ plasma screens, although Sharp was not to be outdone and demoed a titanic 108in LCD – the world's largest. Sony also drew quite a crowd with its understated but eminently impressive OLED screens, ranging from 11in to 27in in size, and measuring only a few millimetres thick.

Blu-ray and HD-DVD continued their scrappy little format war, both maintaining a strong presence, although Blu-ray appeared to have

a slight edge overall. Not that LG was taking any chances, announcing its dual format Blu-ray/HD-DVD BH-100 player for the tidy sum of US\$1200.

Even with the emphasis on consumer electronics, the PC featured heavily. Intel launched its mainstream Core 2 Quad processors and Microsoft devoted a lavish stand to Vista. PC gaming received some welcome attention with a range of upcoming DirectX 10 games shown off, including Crysis, Age of Conan, Hellgate: London, Shadowrun and Lord of the Rings Online. Xbox Live and Vista interactivity was also demonstrated with the likes of Shadowrun and UNO.

Microsoft made an impact with the release of Windows Home Server – the base of a file server in the home. HP has the first model available, with more to come from a range of PC vendors.



Apple has announced its long awaited iPhone, only to be promptly sued by Cisco for infringing on its trademark. Even if things go smoothly for Apple, don't expect Steve Jobs' new lovechild to be seen Down Under until 2008.

A tool is now available to crack AACS, the protection scheme on both Blu-ray

and HD-DVD. Called 'BackupHDDVD', it can happily descramble content once a key is entered to unlock the movie. The program doesn't yet find the required keys, but posting has already begun of the Volume Unique Keys of individual titles in certain forums. Once again studios learn copy protection never stops piracy, it just hurts legitimate users.

Dolby showed off its True HD technology at this year's CES, a lossless

audio format which supports 13.1 channels with a data rate of 18Mb/s. It also displayed Dolby Digital Plus, which is the same deal but lossy, supporting 96Kb/s up to 6Mb/s bandwidth.

Also at CES was Corsair, demo-ing its PC2-10000 RAM – that's right folks, guaranteed 1.25GHz at CAS 5, with apparently a lot of headroom to boot. A guessed going price is about one grandma and two spare limbs.



Sealand Ahoy!

Pirates have asked for shore leave, reports Craig Simms.

The Pirate Bay has decided to try to buy Sealand, in a bid to be untouchable by the world's copyright laws. Sealand is an old sea base constructed during World War II outside England. Since abandoned by the military, an enterprising chap by the name of Paddy Roy Bates fought his way in and took over, claimed regency and after a few scuffles, an English court declared Sealand to be outside of England's waters, prompting said fellow to claim it an independent state. The US and Germany believe it to be part of the UK however Sealand claims it's its own nation.

And now it's up for sale, and this legal grey area apparently makes it the perfect data haven

for pirates. That is until the US decides to recognise its sovereignty so it can bomb it without repercussion, anyway.

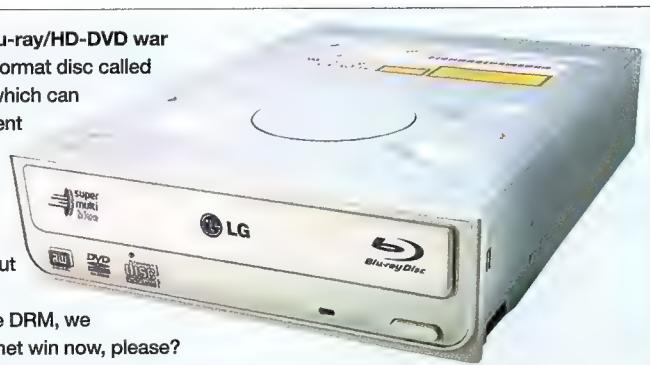
The full low down can be found here (buysealand.com).

Efforts are also underway to set something up in Ladonia (www.ladonia.net), a breakaway faction trying to claim independence from Sweden.

One has to question moving things into a country of dubious independence and legal standing that most people have never heard of, as should copyright heavy weights try anything its likely no one would care.

Seriously guys, buy a moonbase already.

Warner, tired of the Blu-ray/HD-DVD war
has developed a dual format disc called 'Total Hi-Def', or THD, which can handle dual layer content on both sides of the disc. With dual format players, and dual format discs at least everything will play – but for twice the licensing cost and with twice the DRM, we imagine. Can the Internet win now, please?



FUTUREPROOF

Gazing into the crystal ball of tech

All SED and done

Remember SED, the Surface-conduction Electron-emitter Displays that were meant to dominate the TV industry? It seems Canon has hit another snag in releasing it to market.

Nano-Proprietary, who licensed the SED technology to only Canon, stated Canon had breached licence with its subsequent partnership with Toshiba, and a court case is now pending. Canon bought out Toshiba's share of the dually developed SED but Nano-Proprietary is still suing Canon for breach of contract and is terminating the licence. It's more than happy to renegotiate under 'reasonable terms' though.

Canon is reviewing a decision to build a US\$1.49bn panel production plant, and the end of 2007 release date will inevitably be delayed again. It's now also less likely that the SED will be cost competitive with plasma and LCD, and considering the excellent developments in LCD, Samsung/Eastman-Kodak's continual work on OLED and the newly developed laser TV, SED may arrive too late.



POST OF THE MONTH

The Christmas holiday period spawned some very magical posts. The forums were alive with Christmas spirit powered goodness.

The usual Christmas holiday influx brought many amusing new Atomicans into the fold. The festive spirits also stimulated some quality conversation rare in more normal times of the year.

But the first POTM of 2007 goes to spyder:

Atomic 2006 – the year that was – spyder

www.atomicmpc.com.au/forums.asp?S=1&c=1&t=99476

Spyder delivered an astounding summary of the year of *Atomic*, as he always does. Everything of note that happened in this fantastic community, beautifully summarised, and with a mountain of links.

It was a major undertaking, a hell of a mighty effort, all realised so well. Here mousie, mousie! Logitech lovin' coming your way spydey!

Every Post of the Month wins a fabulous Logitech mouse from the brilliant people at Logitech... Huzzah!!!





MMO-jo keeps rising

Massively multiplayer games reigned in 2006, and nothing's changing in 2007, writes Logan Booker.

Never has the gaming industry been so entirely focused on the potential of online. In the console arena, Microsoft's Xbox Live last year clocked 24 million downloads of games, demos and trailers just six months after its official release back in January 2006, according to the software giant. To further promote the possibilities of its online

console service, MS released its game development IDE, XNA Studio, and complementary community, the Creator's Club. Sony finally saw the light with the PS3, company CEO Ken Kutaragi making some big promises at last year's Tokyo Games Show in regards to its online gaming and distributed computing capabilities.

“ MMO growth shows no signs of slowing down, stopping or vomiting vodka into your girlfriend's purse. ”

SHORT CIRCUITS

Fans of Bethesda's RPG Oblivion don't have long to wait for the title's first official expansion. Due in the second quarter of 2007, Oblivion: Shivering Isles will feature more quests, creatures, weapons, armour and characters – about 30 hours of extra gameplay. Reports suggest players need to pass through a magical gate in Niben Bay to fight the forces of the god of madness, Sheogorath.

The founders of legendary developer Rare, Chris and Tim Stamper, have left the

company. Purchased a few years back by Microsoft, Rare has failed to release any standout titles to rival the success of 1994's Killer Instinct or the N64 title GoldenEye 007. Rare continues under Microsoft, but is barely a whisper of what it used to be.

The Sam and Max episodic content continues, with developer Telltale Games announcing a February release for the next instalment entitled The Mole, the Mob and the Meatball. It will be the third game in a six-part

Consoles however mean nothing in the PC world, where massively multiplayer games are, more and more, proving the more tempting endeavour for publishers and developers. You don't have to search hard for proof: Interplay fishing for investors for a Fallout MMO (and failing, thanks to a forced bankruptcy); two of the biggest fantasy franchises in the world, Dungeons & Dragons and Lord of the Rings, has launched and will launch, respectively, an MMO; the release of The Burning Crusade expansion to Blizzard's World of Warcraft, undoubtedly the most-played PC game in the world; and the ill-informed media coverage of titles like Second Life, where players have the opportunity to turn their gaming experience into a paying occupation – well, two of them do. Maybe.

Unsurprisingly, MMO growth in 2007 shows no signs of slowing down, stopping or vomiting Red Bull and vodka into your girlfriend's purse. In late January, Saga, a persistent fantasy/sci-fi RTS, Vanguard, a fantasy RPG and Richard Garriott's Tabula Rasa, a sci-fi/magic RPG, all entered into their beta test phases.

Saga is your standard fantasy RTS and will feature five sides – Machines, Magic, Nature, Light and War. Using a 'collectible card game' mechanic, players will buy booster packs containing spells, units and buildings, and can trade them via an in-game auction house. Just like Magic: The Gathering, players will have to build their own 'decks', customised to their individual play style.

Vanguard: Saga of Heroes – popular word, that Saga – like over 90 percent of the MMO market according to **MMOChart.com**, is your more traditional fantasy RPG. Unlike competitors such as World of Warcraft, Vanguard hopes to create unique roles for specialised and hybrid classes to avoid the stereotyping problems that plague the genre.

Finally, Tabula Rasa is Garriott's second foray into the MMO space, his first being Ultima Online – now very much the property, and product, of EA. Tabula Rasa combines sci-fi with magic, so ammunition and mana are as important as each other.

Interested players can sign up for each beta test by visiting the following sites:

Saga: www.playsaga.com

Vanguard: www.vanguardsoh.com

Tabula Rasa: www.playtr.com/beta



series and will follow Sam and Max's attempts to infiltrate the Toy Mafia and discover the fate of an inside agent. For more information, check out the following website: www.telltalegames.com



Clive Barker's Jericho

Release date: Q1 2007

Clive Barker hasn't touched the gaming arena since the Unreal-powered horror FPS Undying in 2001, which the critics loved but the public at large failed to buy. Clive's Jericho however sees the return of one of the world's top horror fiction writers to the gaming fray.

Jericho Squad member Joe Falke and his team-mates are gifted with special abilities and weapons to aid them in saving the world. The team investigates the city of Al-Khali, which has the odd habit of appearing and disappearing. Imagine babies crawling around with their entrails trailing behind them, and harpies with human flesh for wings, and you're halfway there.

Platform: PC, Xbox 360, PS3

Publisher: Atari

Web: au.codemasters.com



Virtual Fighter 5

Release date: March 2007

It's been in arcades in Japan since July '06, but this month should see it released on PS3. Not that it helps anyone in Australia, considering the lack of PS3 consoles. Don't start crying though – an Xbox 360 version is planned for March.

Returning in the fifth instalment are Akira Yuki and Wolf Hawkfield, as well as two new characters, El Blaze and Eileen, with the total character count coming to 17. El Blaze moves will be based on wrestling, combined with the speed and flexibility of acrobatics, while Eileen will use a fighting technique called 'Monkey Kung Fu'. Players will be able to choose from up to four base costumes for each fighter and will be able to further accessorise with unlockable items.

Platform: PS3, Xbox 360

Publisher: Sega

Web: www.sega-europe.com



Blizzard's first crusade

World of Warcraft: The Burning Crusade has arrived and *Atomic* made sure it was launched in style, writes Ben Mansill.

January 17, 2007 saw the massively anticipated expansion to World of Warcraft – The Burning Crusade – go on sale around the country.

The Burning Crusade was quickly snapped up by thousands of eager gamers at the stroke of midnight, when the Blizzard okay-to-sell date passed.

At Sydney's Chatswood Electronics Boutique almost 500 gamers gathered outside the store. At 10pm the doors to Westfield were opened, and two hours of good fun ensued before the midnight gong struck, and the game could be officially sold.

Your crew of Logan, Craig and yours truly were on hand to provide the entertainment, and do the official MC business, helped along by a lovely booth babe and a bloody great Orc.

WoW trivia contests were held, a costume competition wowed the crowd, and we showed off the winners of the funny picture comp – www.atomicmpc.com.au/article.asp?CID=71431

At the stroke of midnight and after a thrilling

10 second countdown, the floodgates opened and the Electronics Boutique somehow managed to efficiently deal out hundreds of copies – plus a truckload of merchandise – in less than 40 minutes.

Bravo to all involved! And a mighty thanks to everyone that came along and helped us have a great time!

A video of the night is available on the *Atomic* website – www.atomicmpc.com.au – along with loads of photos of the festivities so be sure to check them out... if you get a moment between quests.



According to statements made by

Flagship Studios chief executive Bill Roper at CES 2007, the developer's upcoming game Hellgate: London will sport a massively multiplayer online component. While details are scarcer than the plot of an Adam Sandler movie, Roper did mention that the MMO side of the game would feature guild support, player versus player combat and instance raiding. Guess you can take the man out of Blizzard, but not Blizzard out of the man.

There's no shortage of coolness on

the Internet, but the hacking up of an NES console to fit the entirety of its internals inside a single controller is truly ultimate. A forum user by the name of 'G-force' at www.benheck.com posted his mod, with pictures, showing step by step how he created this excellent piece of hardware. For all the details check out: benheck.com/phpBB/viewtopic.php?t=14764



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BLIZZARD
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After seven years of Max Payne, Remedy Entertainment has turned its attentions to helping Alan Wake get through the night.



Alan Wake's disturbing dream world is sure to keep you up all night.

Petri Järvilehto and Markus Mäki, Remedy

Logan Booker goes head to head with developer Remedy, creators of Max Payne and the upcoming – and breathtaking – Alan Wake.

Remedy hasn't made a lot of noise in the past few years. Actually, it's made no noise at all. It's no biggie though, considering that the folks at this amazing studio have been hard at work on what will be one of the first DirectX 10 games, Alan Wake. The screenshots are gorgeous – almost as gorgeous as Petri Järvilehto and Markus Mäki, creative director and development director respectively, over at Remedy. And we had a chance to chat to them.

atomic How does it feel to still be an independent developer, especially in what is a very harsh environment? Have you been approached at any point by publishers expressing an interest in buying Remedy?

Petri Järvilehto We love being able to work on games and are privileged to work with a talented, driven team. Successful independent game developers are a rare breed and our ability to create original IP is in high demand. We're not really interested in selling the company though.

atomic What do you believe has helped Remedy stay independent? What do you believe are the big problems that face indie developers?

Petri Järvilehto The stakes are higher than last time round. Risk averseness from publishers is an understandable fact. Equally companies have to change with the environment – the industry is becoming increasingly complex and requires

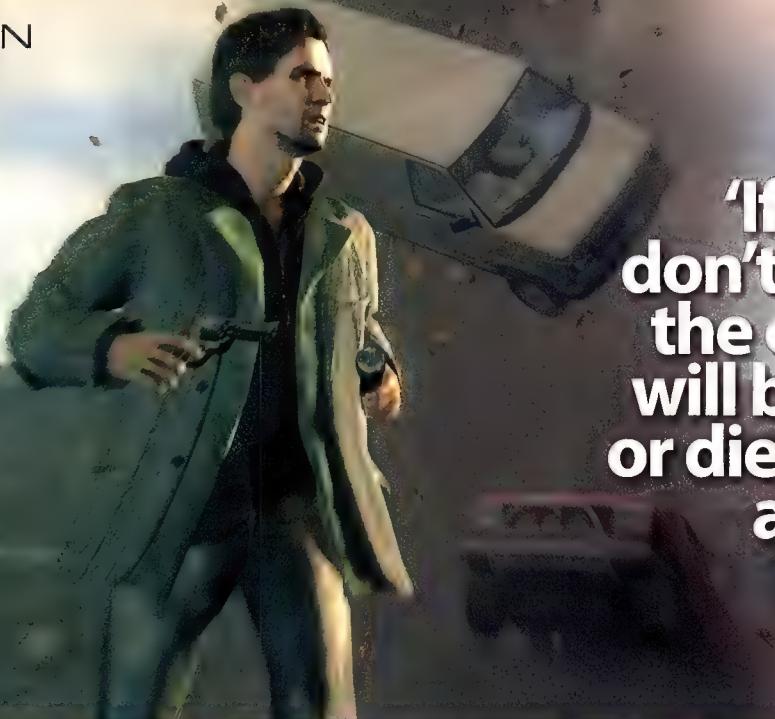
new skill sets, not only within game development, but also in terms of managing a company and in planning and organising. The internal complexity of an organisation must match the complexity of its environment – if the companies don't evolve to meet the challenges they will be marginalised or die. It is Darwinian and can be cold. However, new and different kinds of players enter the field – look at the current boom of outsourcing and middleware as well as the success of casual games and emergence of a viable handheld market.



atomic In your experience, how does the business of games compare to that of other products?

Petri Järvilehto The creative meets technical.

Really this is a unique area and mixture of two very different worlds. What makes it different from other products is that games combine entertainment with disciplined software development. So, we combine different elements that are usually created in very different kinds of organisations. On one side of the coin storytelling and evoking emotions are as important as compelling art and design. The other side of the coin is fantastic technology. Our software must be leading edge and clearly support the end goal – we want to entertain the widest possible audience in the best possible manner.



'If the companies don't evolve to meet the challenges they will be marginalised or die. It is Darwinian and can be cold.'

atomic Is online distribution something Remedy would consider using? Given that the company is independent, it does provide a lucrative, easy way to get your games into the hands of people that want it, without the trouble of going through or trying to find a publisher.

Petri Järvilehto I don't think anyone wants to exclude digital distribution from the long-term. However, consumer behaviour has not changed that fast. Especially if you look at the mainstream appeal and access that we want for our games.

There is also a great many reasons why traditional publishing and distribution functions exist, these cannot simply be sidestepped. For example, now that we're working with Microsoft, we have a great fit of complementary talents and a shared passion to create something awesome. Its wide resources and strong and dedicated team allow us to focus on making Alan Wake the game it deserves to be and to continue our track record of success.

atomic Further to the last question, what role do you believe publishers will play in five or 10 years time?

Petri Järvilehto The industry is maturing and a certain consolidation is natural as we have seen from other fields. The stakes are fairly large for next-gen games and some publishers will struggle to finance a portfolio from their balance sheets. However, as an industry we will continue to grow and key publishers will do well, the others will need to consolidate or to find niches where they are strong. There will always be an ongoing need for access to capital and markets, the need for testing and leveraging production knowledge.

atomic What do you think of the MMO business model? Is it the future of games or do you feel it will eventually dry up?

Petri Järvilehto For some this is a solid model to build on. We have seen many drive into this market with ambitious targets and great plans. Some will

do really well I am sure. Then again, it's a really risky business model. The budgets involved in normal game development are already quite high and the financial requirements for a new MMO launch seem staggering. And very few of the recent MMOs seem to be successful.

So my prediction is that a few key players (like Blizzard) will stay on top of the market and most of the new players trying to enter the MMO field will crash and burn.

atomic What is your opinion of hardware-accelerated physics and AI? From a business point of view, do you think it's wise to invest in these technologies as a developer while they're still in their infancy? What is your approach to embracing advances in technology?

Markus Mäki The industry needs a more unified API before hardware-accelerated physics become commonplace. The marketplace is unfortunately a bit of a mess right now, and I expect it'll take a few more years before it clears out.

With Max Payne 2, Remedy was one of the first companies to release a game that uses physics extensively, especially on all platforms (PC, Xbox and PS2), so I'd like to consider us being an early adopter of technology. But the tech needs to be something that really adds value to the majority of the gamers out there!

atomic Remedy has a reputation for staying on the cutting edge of technology with its titles. Is this a harder thing to do these days, considering the expectations of gamers in this age of powerful CPUs and GPUs?

Petri Järvilehto:
'The stakes are higher... risk averseness from publishers is understandable.'

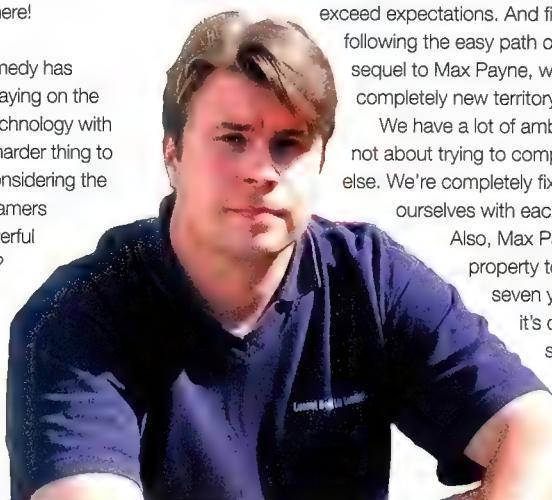
Markus Mäki We feel that the key is actually to match technology to the game concept, as Alan Wake's tech does with the use of light. The more powerful platforms just give us opportunities to do more of this interaction between pure technology and gameplay. Obviously it is a lot of work and the technology investments are massive, but in our opinion it's clearly worth it. We just need to constantly evolve in the way we create the technology and tools.

atomic What would you say are the key things you have learned from working with Max Payne and its sequel? How have they influenced the development of Remedy's future titles?

Petri Järvilehto Without a shadow of a doubt the Max Payne games were a great school for us. Now we get to use many of the things we learned during their development. Having said that, I feel that we've always been a company that sets new and even bigger challenges for ourselves. Working with Max Payne 1, the challenge was whether we could simply deliver such a huge game and come up with new gameplay innovations. With Max Payne 2, there was a lot of pressure on whether we could actually follow up to the first game's success, within a rather short development window, and it felt so good to be able to meet and exceed expectations. And finally now, instead of following the easy path of creating one more sequel to Max Payne, we're striking out into completely new territory.

We have a lot of ambition and we're really not about trying to compete with anyone else. We're completely fixated on out-doing ourselves with each and every game.

Also, Max Payne was a fantastic property to work with, but after seven years of Max Payne it's quite refreshing to get started on something completely new. 



atomic



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“Want the ultimate heatsink? Get one forged from synthetic diamond.”

in turn giving you the feeling of the absence of heat. And, just to confuse you, even though ice is very cold to touch, it still actually has heat. How so?

That's what *absolute zero*, or zero Kelvin (-273.15°C) is all about – the temperate where molecules essentially come to rest, having no movement and generating no heat. Well, as close as possible – the third law of thermodynamics tells us we can never quite reach that state. So ice at 0°C is quite comparatively warm. Energy still moves within it.

The second law also defines you can never generate equal or more energy than you put into a system. In other words no matter what sort of power-generation technology we invent, it will always take more energy to power than we actually get out. Sound crazy? Not really, because we're simply taking energy in one form – such as fossil fuels, natural gas – and turning it into another, but there is always loss in the process (heat and other waste). Of course it doesn't matter as long as our chosen energy sources are abundant or infinite. Whoops.

3. As the temperature approaches absolute zero, entropy approaches zero

In thermodynamics entropy is a measure of energy dispersal at a given temperature. Changes in entropy can be measured against the distribution of energy divided by temperature. The colder it gets the slower the processes of thermodynamics occur.

There's actually one more law of thermodynamics, – the 'Zeroth law', titled as such because it underpins all the others. It states that 'If two thermodynamic systems are separately in thermal equilibrium with a third, they are also in thermal equilibrium with each other' – an excellent pickup line. So how do the laws of thermodynamics relate to cooling?

The motion of energy

Let's take the example of your overclocked CPU. Electricity flowing through your CPU encounters resistance in the conductive materials, scattering electrons and causing the materials to heat up (remembering again that heat is energy in motion).

Adjacent materials conduct this heat, thanks to the second law of thermodynamics, and so the thermal energy moves from the CPU core to the surrounding silicon, then to the heat spreader, the thermal goo between heat spreader and heatsink,

The cold universe

Whether its air, water, peltier or phase change, just how is that our CPUs don't spontaneously explode? Ashton Mills finds out.

Ok, so we're not going to talk about the universe per se, but we are going to look at some its laws – the same laws that govern suns and supernovas also apply inside our PCs. When it comes to understanding the science of cooling, without which our PCs couldn't operate, we first need to look at the universe to see just how our air-cooled GPUs or water-cooled CPUs work at all.

Thermodynamics

The science of cooling starts with the laws of thermodynamics, a set of rules we hairless monkeys defined to help us understand just how heat works. The study of thermodynamics is the study of energy, and how it moves from one form to another. In fact heat is literally energy in motion – kinetic energy generated by the movement of particles at the atomic or molecular level. The greater the movement of these particles, the greater the thermal energy.

While it can be seriously head-bending stuff (and thus great for impressing the opposite sex), we can learn a lot from first three laws of thermodynamics:

1. Energy can neither be created nor destroyed

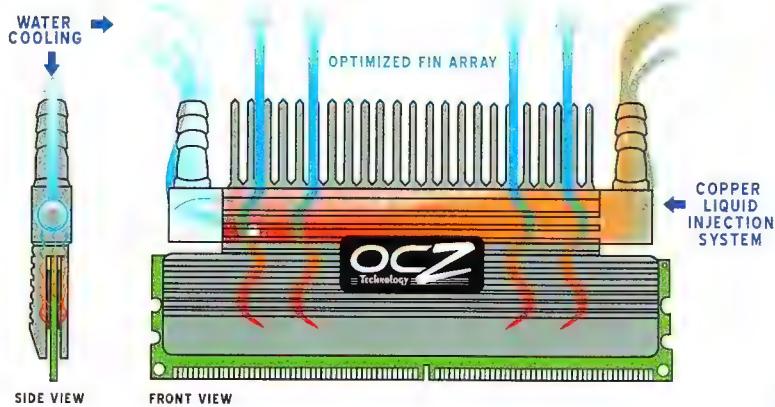
Known as 'the law of conservation', it states that the amount of energy in the universe is finite and fixed. This is why inventions that claim 'free energy' are a crock of shiznit. Energy can't be created from nothing. It is, however, transformable from one form to another. In the words of Yoda, always there is balance.

2. Thermal energy naturally flows from hot to cold

This is actually a complex rule involving entropy, occurring as heat migrates to colder areas, reaching a state of equilibrium. The temperature of two bodies will tend to equalise as the heat migrates.

The second law refers to how bodies of different temperatures ultimately regulate themselves and meet at an equilibrium, at a given rate of change defined by the entropy of each system. When a cold drink is left in a warm room, heat transferred to the drink will reduce the temperature of the room while the drink warms up. Eventually the two will meet.

This energy migration occurs from hot to cold. Think of a chunk of ice in your hand – it feels cold, but not because the ice generates 'cold' but because, being colder than your hand, heat travels from your skin to the ice, causing it to heat up and melt and



MAXIMUM HEAT DISSIPATION VIA HYBRID COPPER & ALUMINUM DESIGN & OPTIONAL USE LIQUID INJECTION SYSTEM

▲ OCZ taking advantage of the properties of copper, aluminium, and water to keep RAM cool.

and finally onto the heatsink itself. At each level, heat will distribute over the area of the material, equalising the temperature difference. But because energy is constantly applied – the CPU keeps on generating heat – the entire area of each material in turn will raise in temperature to match that of the energy applied.

Which brings us to the next stage – the heatsink is getting hot. So far all this heat has been transferred by *conduction* – the transfer of energy from a more energetic particle to that of a less energetic particle by direct interaction. From here however we remove the heat from the heatsink with air or water, and this heat transfers by *convection* – literally the conduction of thermal energy to the gas (air) or water (fluid) whereby particles in contact with the heatsink absorb the energy and move on to be replaced by cooler particles, which in turn absorb energy and so on.

This is simple to understand if we think of the whole process operating at a constant. But of course it isn't. At every step, the following values are at play: the inherent thermal conductivity of the conductors; the area, density and thickness of the conductors; the atomic structure; the volume and speed of the air or water; the ambient temperature, and so on. But wait, there's more! As materials heat, their thermal properties can change, so at any moment all of the above values are fluctuating as thermal energy moves through the various materials from your CPU and ultimately out of your case into the ambient air.

Material properties

The biggest influence on the speed at which heat is conducted is the thermal conductivity of the materials. Some materials conduct heat better than others.

The table [top right] lists the thermal conductivity of some materials you'll recognise. Note that these aren't static – as materials heat their properties can change. In the table, the value for air assumes 0°C. Further impure or alloy materials will have different properties. For the purposes of comparison, the values are for pure materials.

You can see why both aluminium and copper are popular choices for heatsinks. Aluminium is 15 times more effective at conducting heat than steel, and copper almost twice that of aluminium. So

why aren't all heatsinks just made out of copper? A number of reasons, not the least of which is expense and weight.

It's also worth noting the properties of silver, surpassing that of copper – now you know why Arctic Cooling uses fine-grained silver particles in its thermal pastes. And again, unless you're Ali G, a pure silver heatsink might be thoroughly bling but would also be extremely expensive.

Speaking of which, notice the effectiveness of diamond. You want the ultimate heatsink? Get one forged from manufactured diamond and you'll have the most uber heatsink on Earth. Might have to sell off your entire family tree into slavery to get it though, but what a worthy cause!

Finally, notice the complete ineffectiveness of air and water as thermal conductors. In fact the solid-to-air interface represents the greatest barrier for heat dissipation, and is precisely why thermal goo is needed (no matter how lapped the surfaces of heatsink and heat spreader, they are still filled with thousands of tiny air pockets – thermal paste fills them). This is largely due to the gaseous and liquid nature of the materials, for which all sorts of wonderful variables apply in thermodynamics, and is why you need to push an awful lot of air for even the smallest amounts of heat to be migrated from a heatsink into surrounding air.

Conductivity of select materials

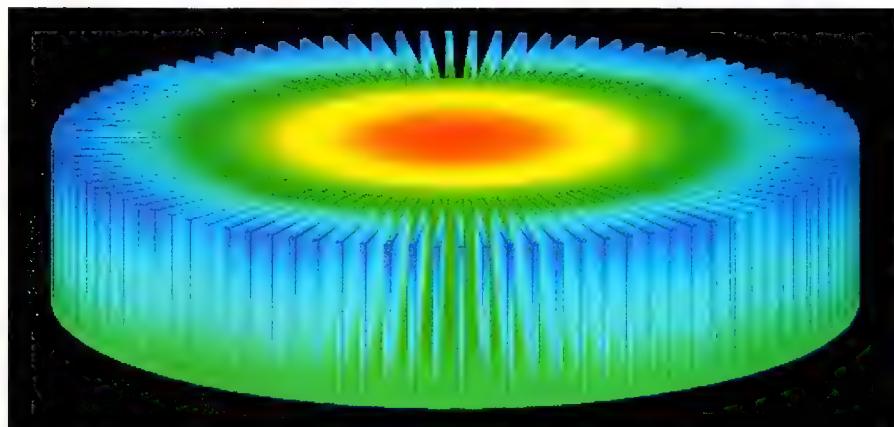
| | Thermal conductivity (W/m-K) |
|-------------------|------------------------------|
| Synthetic diamond | 2000 |
| Natural diamond | 1000 |
| Silver | 429 |
| Copper | 390 |
| Gold | 318 |
| Aluminium | 237 |
| Silicon | 115 |
| Stainless steel | 16 |
| Ice | 2.1 |
| Grass | 0.93 |
| Olive oil | 0.17 |
| Water | 0.6 |
| Wood | 0.4 |
| Air | 0.025 |

▲ Where: W/m-K = watt per metre per Kelvin.

Source: Hukseflux.com, Wikipedia.

The hot sauce

There you have it, a condensed lesson on the nature of heat and by application, cooling. There are of course many more properties at play, including the actual equations that define energy transfer at a given temperature, area, density, atomic structure, value of work (applied energy) and time, and all respective to each system (materials, ambient air, etc). It's complex, fascinating stuff... and is completely cool. ☺



▲ Simulated heat distribution through a heatsink. Source: [Novel Concepts, Inc.](http://NovelConceptsInc.com)



Money in the ether

The download or the box? Tim Dean explores the trend of purchasing games online.

Money is funny stuff. We all carry around these little discs of copper and nickel and sheets of coloured plastic and people actually give us stuff – good stuff – in exchange for them.

The metal and plastic themselves are essentially worthless, except for the fact that we all simply agree that they're not.

Then again, if you think fiat money – currency with little or no intrinsic value – is odd, it's certainly a lot easier to handle than the old currency used around these parts – rum.

Can you imagine? Carting a barrel of rum around to pay for your groceries? Or what about rum-based online banking?

One thing I still don't understand is, if rum was currency, how the hell did colonial Australians actually *buy* rum? With rum? That conundrum keeps me awake at night to this very day.

There's no question that money has come a long way since the days when we could sink our savings in one drunken binge. So too has the way we pay for things. Namely, games.

It occurred to me after spending the best part of 2006 enveloped in a number of MMOs, all of which were purchased online and downloaded on the spot. When I found myself wandering into my local games boutique later in the year to buy a boxed copy of Neverwinter Nights 2, it struck me how strange the whole ritual of exchanging physical currency for software actually is.

Makes me wonder whether that custom may well go the way of rum, in light of the online alternative.

One poll raising this very question appeared on **MMORPG.com** in April of last year, and yielded some interesting results – especially considering the demographic. It can be safely assumed that **MMORPG.com** readers are at least semi-regular gamers and have experience subscribing to online games. Yet, of the 9,043 respondents to the poll, only 27.6 percent regularly download their games rather than buying them in a store. In contrast, a full 41 percent said they still prefer to buy their games in store, with 31.4 percent swinging between the two.

There are likely a number of reasons behind this result. One of the main ones is that there are still a significant number of big release games that are only available in boxed form (not that you can't order your box from an online store). Broadband speeds are also still lagging behind the size of game downloads – even with a 1.5Mb/s ADSL going hammer and tong, it would take over nine hours to download the 6.6-odd gigabytes of Neverwinter Nights 2. Then there's the desire for a nice hard piece of media should we ever need to reinstall in the future.

Even so, I wouldn't be at all surprised if the trend moves steadily towards online purchasing through 2007 and beyond. We're already seeing an increasing number of games being released online – primarily MMOs and other games with a significant online component. There are also online portals, like Steam, that have been up and running for a few years now and are gaining acceptance.

There are also some innovative pricing models coming out. NCSoft, publishers of MMOs such as Lineage and Guild Wars, will be releasing Dungeon Runners some time this year. Unlike other MMOs, Dungeon Runners is free to download and free to play – with a caveat. You only get access to the best gear and abilities if you subscribe. But what a way to suck people into the game in the first place!

As we gamers become more comfortable with the idea of slinging a credit card number over the

Net to get our wares and publishers get more savvy in their online distribution models – such as by allowing us to download a game again if we need to reinstall – online sales will surely start to overtake store sales.

I mean, if it can happen to music, then why not games too?

This photo is an approximation of what Tim looks like, but his email address is correct.
tim@atomicmpc.com.au





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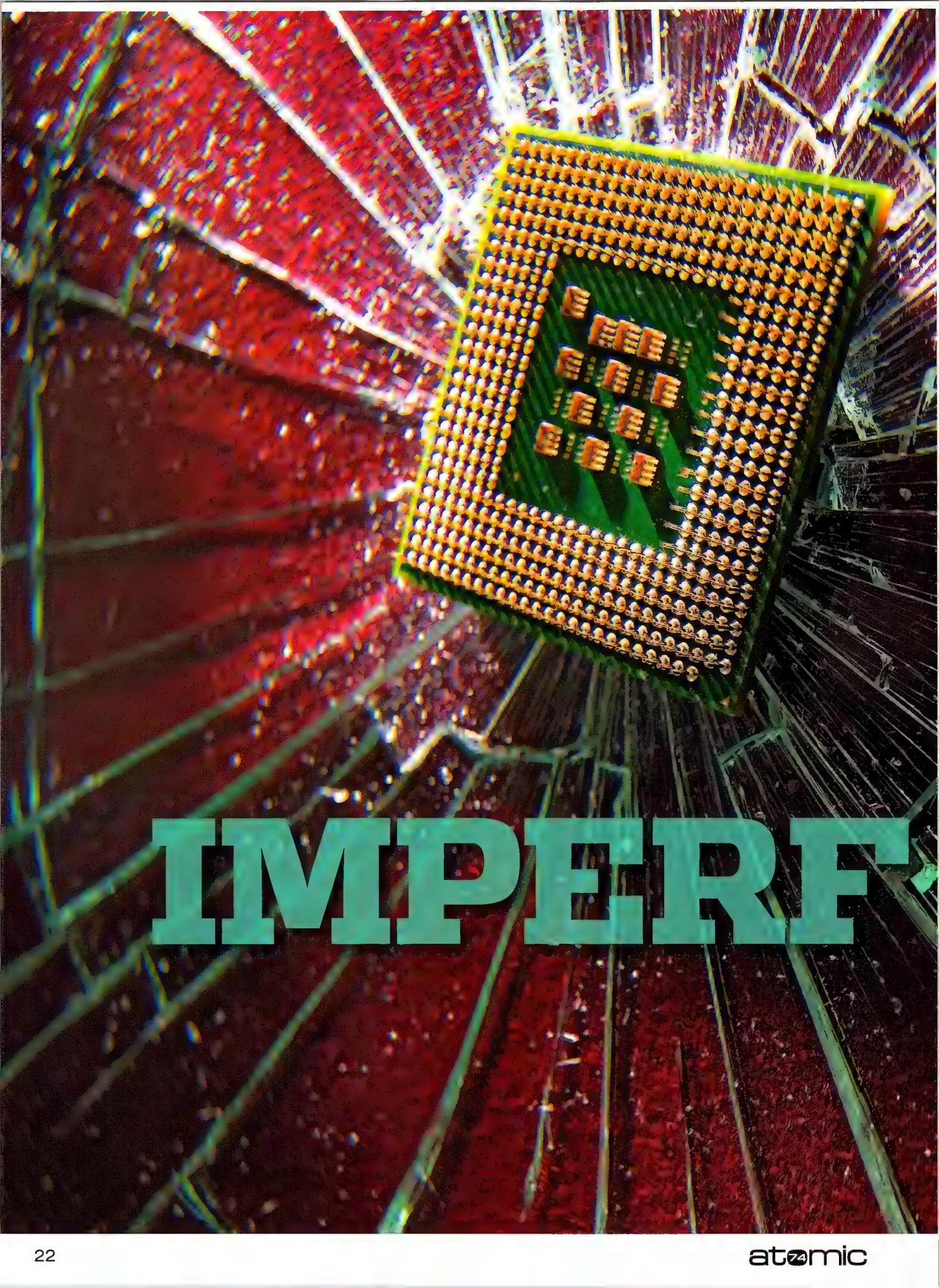
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IMPERFECT

W

e're now well into the 21st century, and there are still no flying cars, no weekend jaunts to the moon and no 10GHz processors. It's shameful.

While we can forgive the mid-20th century futurists for their optimism over the former two promises, the latter is a different matter altogether.

As recently as 2002 we had some apparently reliable sources, such as Louis Burns, Intel's general manager of the Desktop Platforms Group, talking at the Intel Developer Forum in ebullient tones about 10GHz being just around the corner.

Yet here we are, firmly rooted in the sub-4GHz space, with nary a 10GHz processor in sight. Heck, there aren't even any processors above 5GHz coming any time soon from Intel, AMD or IBM.

So, what ever happened to 10GHz?

Before we delve into the whys and wherefores of the 10GHz non-revolution, let's take a quick stroll through some history to see what was actually being said about 10GHz in the first place.

The promise

The year is 1996. The PC revolution is in full swing. Windows 95 is spreading to each and every PC it can find. The Internet is evolving beyond university labs and into living rooms. IBM's Deep Blue has just sent Garry Kasparov packing. John Howard has a landslide election win against Paul Keating.

And Intel luminary, Andy Grove, is addressing the throngs at the world's largest technology convention, Comdex. In those days of the 200MHz Pentium, Grove stuns the audience by painting a picture of processors in the year 2011.

'Today, we are able to make a prediction of where our technology may take us 15 years from now. Our best estimates, based upon past performance, existing technology and the laws of physics, show that the microprocessor of 2011 could look like this:

Transistors: 1 billion, Die size: 1.8in (45.7mm), Frequency: 10GHz, MIPS: 100,000*

Grove made this prediction with confidence, and that prediction remained a mainstay of Intel's strategy and ambition all the way up to the early 2000s. Up until that point Intel had good reason to believe such an achievement as a 10GHz processor was within reach, perhaps even sooner than 2011. After all, for the prior

**What ever
happened to
10GHz processors?
Tim Dean takes
a look at the
revolution that
never happened.**

EGHT

TEEN

two decades its engineers had broken barrier after barrier and managed to boost the frequency of its processors at exponential rates.

Even in the early 2000s the microprocessor industry still had every expectation that 10GHz was just over the horizon. At the spring Intel Developers Forum in 2002, Louis Burns took the stage to demonstrate the latest achievement from Intel's labs: a 3GHz Pentium 4 using the high-speed and MHz-prolific NetBurst architecture.

Following the demonstration, Burns talked about the next step for NetBurst. 'You've seen air-cooled at 3GHz. We told you this architecture is extendable to 10GHz. We have pretty strong views on that,' he said.

However, even then there were the first hints that things might not be as easy as all that. Burns went on to say, 'Don't expect 4GHz to be rolled out in an air-cooled fashion.' Still, he was optimistic about the future. 'We wanted to show it's an extendable architecture, and we have positive indications to be able to take this to the 10GHz space,' he said.

Where we're at

Cut to today, and the fastest desktop processors still haven't broken the 4GHz mark mentioned by Burns at the 2002 IDF. Instead the highest frequency single core processors from Intel and AMD are hovering around the 3.8GHz mark. Multi-core processors are running even slower, with them sitting around 2.8GHz for AMD and 2.66GHz for Intel (or 3.2GHz for the Pentium D, although that's kind of cheating by having two single core processors glued together).

So much for Moore's Law? If you take a look at a chart of



Intel processor speeds since 1971, you would wonder.

As you can see from Figure 1, processor speeds initially leapt ahead in terms of frequency following the release of the Intel 4004 in 1971. Things then settled down into a more stable trend in about 1987 with the Intel 386, and continued on a steady rise all the way through to the early 2000s.

Applying Moore's Law to processor frequency starting in 1971 with the Intel 4004 shows the ramp of processor frequencies is a little behind the curve, but not by much. Even if we apply Moore's Law from the 386 onwards, the curve of real processor frequencies is trailing, but it's still increasing at a logarithmic rate. However, by either formulation of Moore's Law we should have hit the 10GHz mark sometime around 2004 or 2005.

The really interesting phenomenon occurs just after Louis Burns' IDF speech in 2002. From that point onwards processor speeds hit a plateau around 3.8GHz. In fact, 2004 is arguably the high point for processor frequencies as new multi-core CPUs released since then have steadily dropped to the 2.4GHz to 2.8GHz mark.

However, frequency doesn't tell the whole story. In fact, Moore's Law was originally formulated to refer to the number of transistors that can be efficiently and affordably packed into a mainstream processor. Using this metric, we see a different story to that being told by frequency alone.

Figure 2 starts with the humble 4004 of 1971, with its dainty 2300 transistors, and finishes with the latest Core 2 Extreme QX6700 processor (not marked on the graph), packing in a staggering half-billion transistors – although, admittedly, most of that is occupied by cache.

The truly astounding fact evident from this chart is that transistor count today correlates precisely with Gordon Moore's original prediction that they'd double every 24 months. That's some foresight.

So, if frequency has been stagnant for a few years, but transistor count has continued to double every two years, has that had an effect on performance? To answer this we can turn to a chart showing the (estimated) performance of Intel's pedigree of processors in MIPS (millions of instructions per second).

The interesting thing apparent from Figure 3 is that even with a slackening of frequency in the past few years, performance continues to surge ahead at an impressive rate – even exceeding the rate predicted by Moore's Law.

How can this be? And what does all this mean for the prospect of 10GHz processors cropping up at some point in the future?

The NetBurst gamble

To answer this conundrum, we need to take another brief trip into history, and place ourselves in the thick of frequency madness in the late 1990s, and see how it influenced the boffins in bunny suits at Intel.

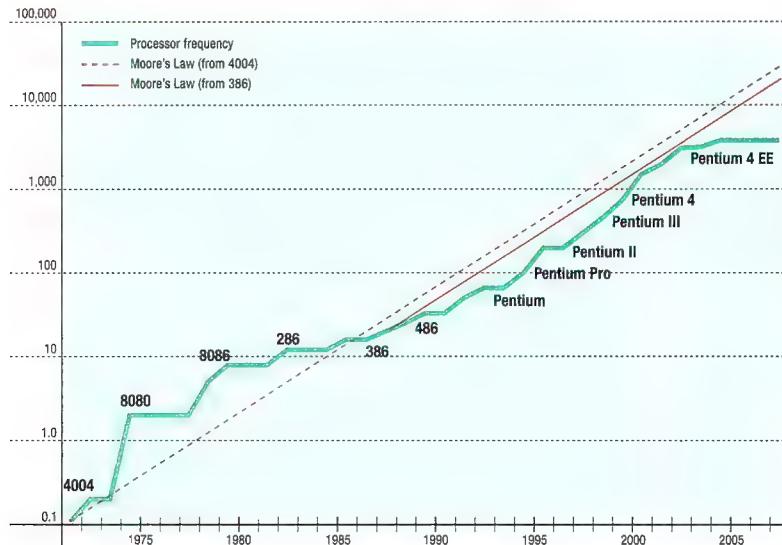


FIGURE 1: MOORE'S LAW – FREQUENCY
This chart applies Moore's Law to processor frequencies (in MHz), starting with the Intel 4004 in 1971.

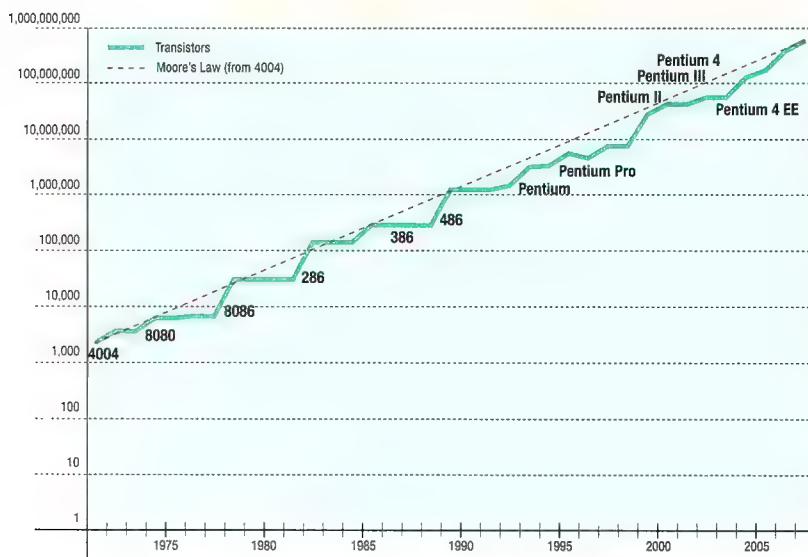


FIGURE 2: MOORE'S LAW – TRANSISTORS
This chart applies Moore's Law to its original subject: The number of transistors in a mainstream microprocessor.

The interesting thing is that even with a slackening of frequency in the past few years, performance continues to surge ahead at an impressive rate – even exceeding the rate predicted by Moore's Law.

From the late 1980s onwards Intel and other microprocessor manufacturers experienced prodigious performance boosts by steadily ramping up the frequency of their processors – as we can see from Figure 1. After all, double the frequency, and you double performance. And if the processor gets to a point where it's running too hot, just shrink the manufacturing process down a notch to keep things sailing along smooth and cool.

However, processor architecture was also getting more complicated through the 1990s, with features such as superscalar execution, pipelining, branch prediction and out of order execution becoming common. This increasing complexity was proving to be a barrier when it came to ramping them up to higher frequencies. With such complex procedures taking place, a higher frequency chip had a greater chance of stumbling at a step in the process, thus causing errors.

By the late 1990s Intel had the Pentium III and AMD its Athlon, both of which represented the pinnacle of architectural

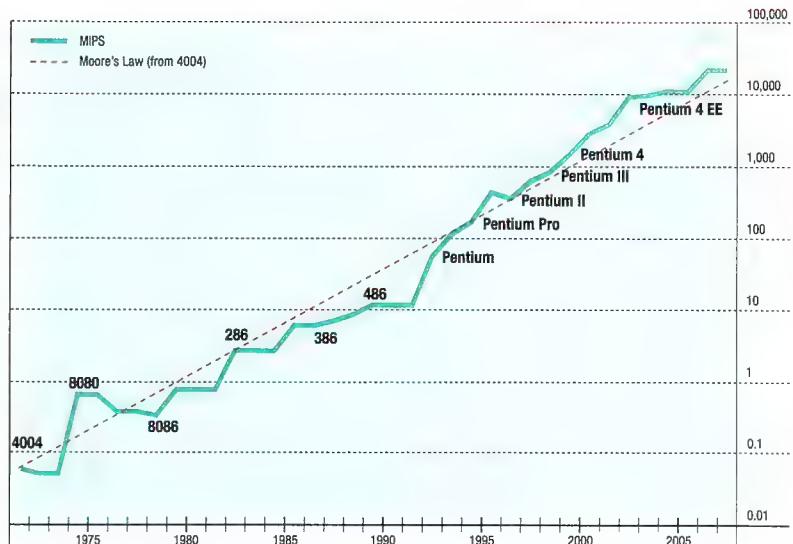


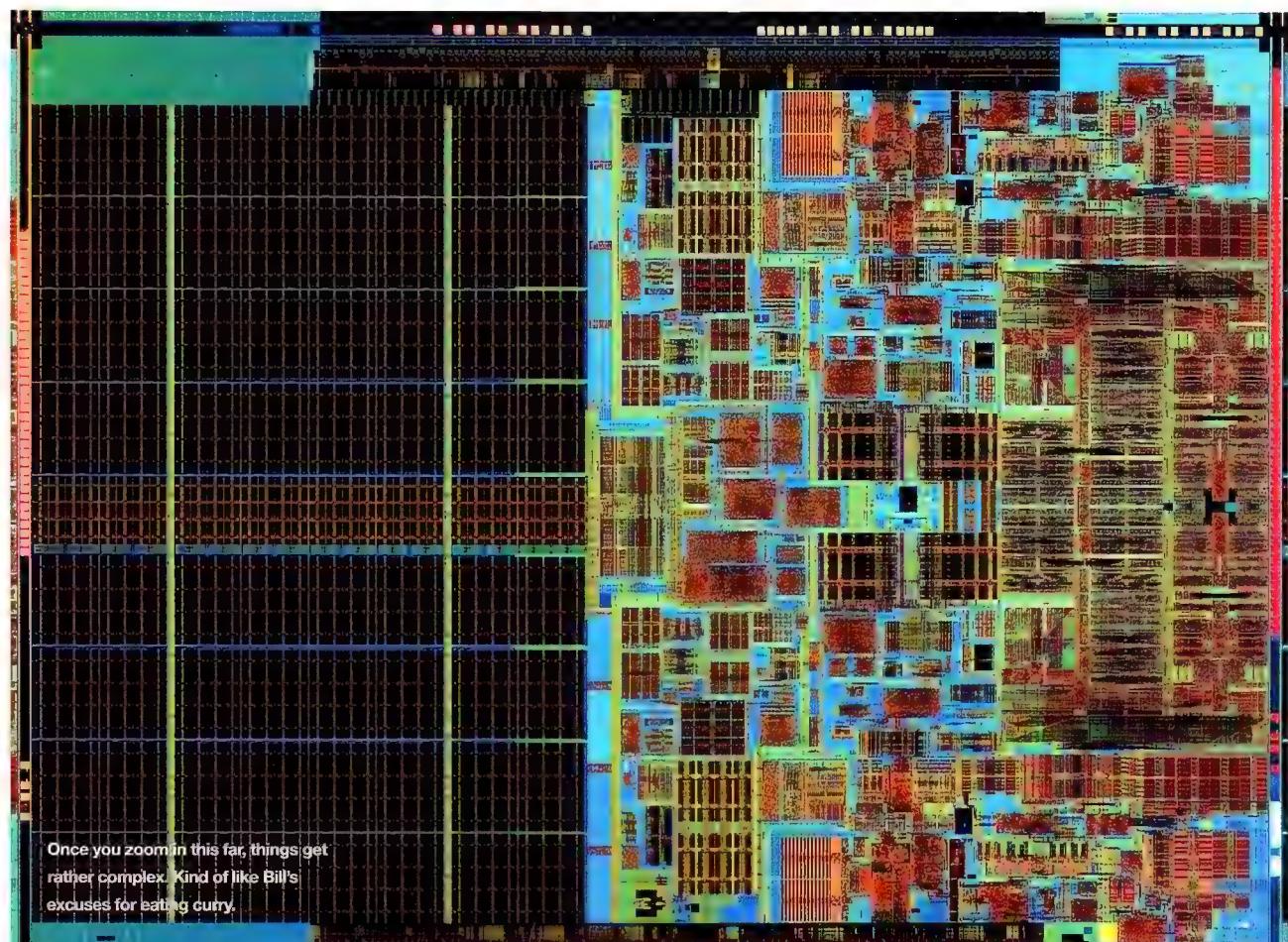
FIGURE 3: MOORE'S LAW – MIPS

Since the Pentium was released in 1993, processors have been steadily doubling in raw performance roughly every 24 months.

complexity, and both were on a mad dash to 1GHz.

Yet, once that 1GHz barrier was broken, serious problems with the microarchitecture became obvious. In fact, Intel had to recall its first 1.13GHz Pentium IIIs because of widespread instability. Even shrinking the manufacturing process down to 130nm only allowed a marginal increase in frequency – up to 1.4GHz for the Pentium III.

That's not to say Intel was unprepared. Since the late 1990s its engineers had been beavering away on a new processor design – one that promised to free up the architecture for much higher frequencies. This was the architecture that was



going to take Intel all the way to 10GHz and beyond. And it was called NetBurst.

At the core of NetBurst (no pun intended) was a big fat 20-stage pipeline – later increased even further to 31 stages in the Prescott Pentium 4. This was fully twice the length of the pipeline in the Pentium III. The main benefit of a longer pipeline was that each stage could be simplified, which made it easier to ramp up the frequency.

NetBurst yielded immediate results, with the first Pentium 4s being released at 1.4GHz and 1.5GHz – an almost 50 percent jump in frequency compared to the contemporary Pentium III and Athlon processors. However, performance was not significantly higher (and was in many cases slower) than the older architecture.

This was because a longer pipeline also meant a higher chance of branch misprediction and a correspondingly reduced number of instructions per second. According to Intel, that was a fair price to pay, as the NetBurst architecture could

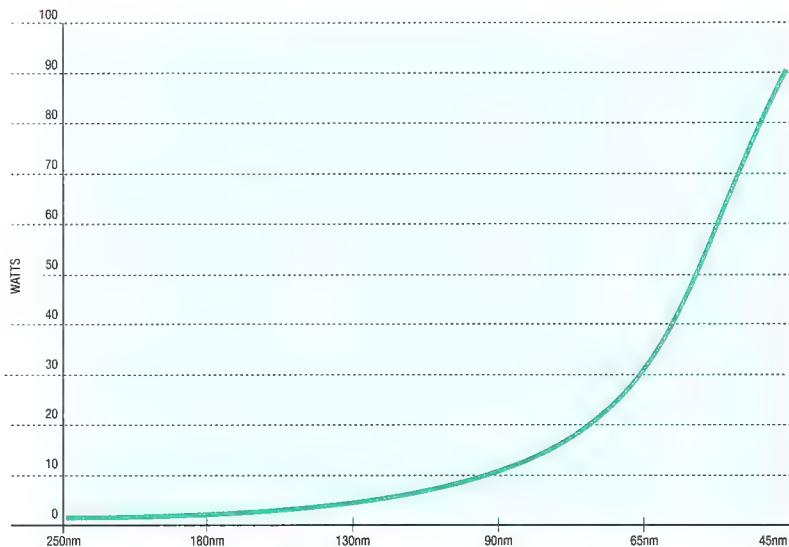


FIGURE 4 – CURRENT LEAKAGE
The current leaked from a processor increases exponentially the smaller the components get.

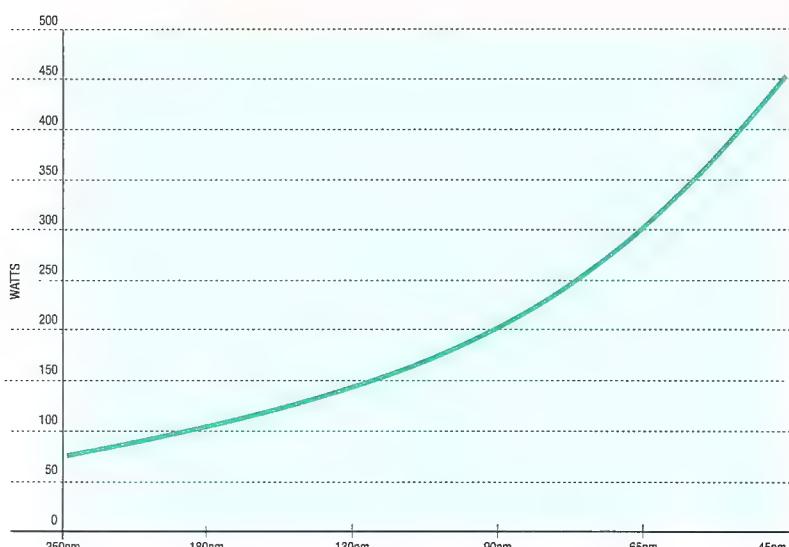


FIGURE 5 – POWER CONSUMPTION
As leakage increases, overall power consumption increases, and so too does heat.

Sadly, imperfections and faults also get bundled along with all the benefits of Moore's Law, increasing their number with each generation of processor.

run at a high enough frequency to more than compensate for its architectural foibles.

According to Graham Tucker, technical manager for Australia and New Zealand at Intel, this was fully in accordance with microprocessor design doctrine of the day. 'In 2000, given the state of technology and with a limited transistor count, the only practical way of ramping performance was to increase frequency,' says Tucker.

And it worked. For a time.

The Pentium 4 and NetBurst architecture scaled smoothly, hitting the 3GHz mark almost exactly two years after its launch. But then it ran into a problem, otherwise known as the laws of physics.

You can't change the laws of physics

Microprocessors are complicated little buggers, although ultimately they adhere to just a small number of basic principles. They're manufactured using a silicon base, which serves as an insulator. On top of the silicon is laid a series of metal traces, which act as transistors and connecting wires. Hence the term 'integrated circuit' – because all the components are integrated into a single slab of semiconductor.

You then pass a current of a certain voltage over the gap in a transistor – called the gate – and it can be switched to 'on'. Drop the voltage below the gate's threshold and it won't be able to jump the gap, thus turning the transistor 'off'. String enough of these transistors together in a logical fashion and you can perform any calculation imaginable.

If you want to increase the performance of a microprocessor there are a few paths you can take. One option is to improve the way the chip executes commands by incorporating sophisticated techniques like pipelining and out-of-order execution. This will allow a chip to perform more calculations simultaneously, although it also increases the complexity of the processor, adding to the cost of development and manufacture and potentially hindering its ability to ramp up in frequency.

Another way to improve performance is to increase the amount of available cache memory. However, this chews through a lot of the chip's transistor budget and may not leave enough for the rest of the processor.

The easiest and most obvious way to boost performance is to simply increase the frequency at which the microprocessor runs. If those transistors are switching on and off faster, then they can complete their computations even sooner.

But there's a catch. The higher the frequency of a processor, the more current is flowing through its circuits, and this generates more heat. Why?

It's simply a matter of physics.

No semiconductor is perfect. They all leak current to a certain extent. And when a semiconductor leaks current, that

Paul Otellini, CEO and rather big shot of Intel, holding his Core bits.



energy is released as heat. Build up enough heat, and you get the secondary effect of increasing overall resistance, which just compounds matters. Eventually, all you have is a molten pile of metal and silicon, which is of no help to anyone.

Microprocessor manufacturers have known about this problem of current leakage for a very long time, although it's only become a major problem in recent years. The reason is – ironically enough – Moore's Law. Sadly, imperfections and faults also get bundled along with all the benefits of Moore's Law, increasing their number with each generation of processor. If the negative effect of these imperfections scales linearly, then the problem can be managed as it's offset by the increased number of transistors in the processor.

However, if the effect of these faults scales logarithmically, then we have a problem. And this is precisely the case when it comes to current leakage. The smaller the manufacturing process, the more leakage you get by a wide margin.

Current leakage comes in two main flavours: gate oxide tunnelling and sub-threshold leakage. Both are ultimately a consequence of that double-edged sword of die shrinkage. As the size of components within a processor get smaller and smaller, the ability of the silicon to act as an insulator diminishes. Thus, when a current is passed through a transistor some of it leaks through the silicon oxide insulator, which is now only a few atoms thick.

Sub-threshold leakage has a similar cause. Normally a transistor gate requires a current of a certain voltage – the threshold voltage – to jump the gap from the source to the

The 1990s saw an increase in the popularity of instruction level parallelism, which was the capability of a processor to execute more than one instruction simultaneously.

drain and switch the transistor on. When the current is below that voltage, it shouldn't be able to pass from the source to the drain. However, because the insulation is less effective, a small amount of current is able to leak through the gate even when the voltage is lower than the threshold.

The amount of current leakage in early processors was negligible, although once the manufacturing process hit 90nm, leakage exploded (see Figure 4).

Furthermore, for every electron that went wayward through an inadequate insulator, another electron would have to be pumped through the system to compensate for its loss. Thus the power consumption of CPUs was starting to get ridiculous (see Figure 5).

This presents a huge problem for processor manufacturers,

who have suddenly lost their universal panacea for performance: Shrinking the die and ramping up the frequency.

Frequency alone ceased to be the only way to judge the success of a CPU. According to Intel Australia's tech guru, Graham Tucker, this lead to a new yardstick. 'Performance/watt is the new metric,' says Tucker. 'All market segments are wanting more performance and better power efficiency.'

We've all heard the rhetoric in recent years from Intel, AMD and the like about new methods of managing power leakage and heat, such as silicon-on-insulator, High-K dielectrics, strained silicon and dynamic power saving. These have all made significant inroads to pushing frequencies as high as 3.8GHz, but at 4GHz – let alone 10GHz – they all hit a brick wall.

So what now?

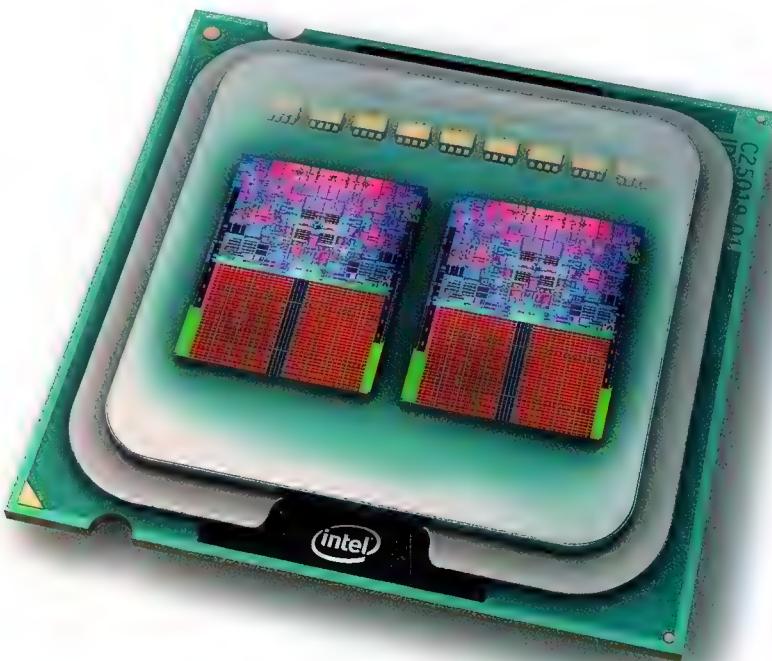
The other kind of parallel

The 1990s saw an increase in the popularity of instruction level parallelism, which was the capability of a processor to execute more than one instruction simultaneously. However, with the critical problems presented by current leakage and power consumption, it appears as though the era of instruction level parallelism is over. No longer can one monolithic processor, even using every trick in the book, keep up the pace in terms of frequency.

This has forced microprocessor designers to head back to the drawing board and scrap their plans for 10GHz CPUs and find a new approach. Thus, in place of instruction level parallelism we have the dawning era of thread level parallelism, as demonstrated by the proliferation of dual and quad core processors hitting the market today.

Why have things gone this way? Remember the chart we looked at earlier that showed transistor numbers were still on track with Moore's Law, even if frequency wasn't? Well, there is more than one way to skin a cat, at least when it comes to processor performance.

Processor engineers found themselves in the early 2000s with this mounting problem of current leakage, high power consumption and heat dissipation, yet process technology



So here we are, with quad core CPUs hitting the market, and eight cores and above on the roadmaps, but we still have an apparent frequency ceiling of 4GHz.

was improving to the point where they had more transistors to play with than they knew what to do with. Even slapping on bigger and bigger caches couldn't deny the fact that frequency had, for all intents and purposes, ground to a halt.

It was at this point that the shift towards multi-core occurred. After all, two processors are better than one.

According to Intel's Graham Tucker, this is a logical step. 'Instead of scaling performance with a single core, if you scale out, you can get more work done at a given frequency,' he says.

However, while thread level parallelism and multi-core processors might yield a nice boost to MIPS, as shown by Figure 3 on page 25, this doesn't necessarily translate directly to improved performance across the board. Ultimately the shift to thread level parallelism throws a lot of the weight onto the shoulders of software developers to optimise their code to make the best use of multithreading. And this is no easy task.

'There are many multithreaded applications available today that weren't around in 2000 that now can take advantage of multi-core processors,' says Tucker. But there are also vastly more applications that currently yield no benefit from multithreading.

The fate of 10GHz

So here we are, with quad core CPUs hitting the market, and eight cores and above on the roadmaps, but we still have an apparent frequency ceiling of 4GHz. So what does that mean for the future of 10GHz CPUs?

Currently there are no firm commitments from any major semiconductor manufacturers that 10GHz will be coming any time soon – which is in stark contrast to a few years ago where Intel was promising 10GHz within a few years.

Even so, this doesn't mean we won't see 10GHz processors some time in the more distant future. Further process shrinks, improvements in materials and architectural enhancements could reduce current leakage to manageable levels. There is also the prospect of using optical interconnects via silicon photonics, as demonstrated by Intel researchers at the University of California Santa Barbara in 2006.

Michael Apthorpe, technical manager for AMD Australia, agrees that optical interconnects are necessary breakthrough at this stage. 'At present it is not on the radar, due to the power and substrate losses... It is also the current trend that parallel computing is the way to go, however these things go in cycles. We are talking about photonic interconnects in our processors which will help overcome some of these problems but that is still a few years off,' he says.

There are some not inconsiderable hurdles to overcome before a 10GHz processor becomes a viable prospect, and even then it won't be in the form of the monolithic single-core CPUs of old.



Performance and Value

DirectX 10 Ready with Ghost Recon and GTI Racing Bundle

It takes a high-performance product to run today's sophisticated game titles. With the Vista operating system poised to change personal computing and digital home entertainment, a card that is ready for the revolution is something you should look into when shopping for a new graphics solution.

Powerful Performance

The ASUS EN8800 series, which includes two models: EN8800GTX/HTDP/768M and EN8800GTS/HTDP/640M, will certainly solve the above issues. First of all, they are powered by Nvidia's latest GeForce 8800 GPUs. The former actually scored 10,531 in 3DMark06 at 1280x1024 resolutions, which is more than fast enough to handle the hottest 3D games.

DirectX 10 and Vista Ready

Second, both models of the EN8800 series are DirectX 10-ready and are fully-compatible with Shader Model 4.0, and enables efficient batch process of game objects and data. The result is far richer and more immersive gaming experience. DirectX 10 support also means compatibility with the up coming Microsoft Vista operating system.



3D Games and Graphics Benchmark Tool Bundled

Since you're buying the card for games, what's better than getting two popular games right out of the box. The EN8800 series bundles Ghost Recon Advanced Warfighter from Ubisoft and GTI Racing from Techland. 3Dmark06 Advanced Version, the premier graphics benchmark software, is also available with the purchase of the two new graphics cards. Whether it's for gamers or overclockers, the EN8800 series offers excellent value in return.

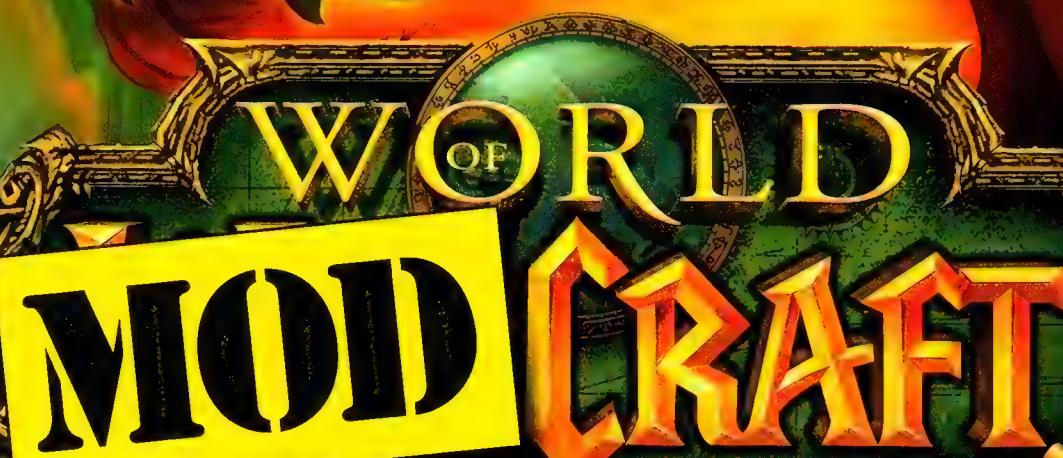
Splendid Video Intelligence Technology

To make all images on your monitor look that much better, the EN8800 series incorporates Splendid Video Intelligence Technology, an exclusive feature found only on ASUS solutions. With Splendid, images enabled by ASUS graphics cards are fine tuned to deliver vibrant visual representations in conditions most favorable to the human eye. Splendid works on top of NVIDIA's PureVideo™ technology to offer sharp decoded video.

Just like what the headline said. The EN8800 series is a combination of high performance and getting the biggest bang for the buck. Please do check out the two new cards if you're looking to upgrade your computer setup.



▲ ASUS scores 10,531 on 3DMark06.



WORLD OF MOD CRAFT

Looking for ways to improve your World of Warcraft skills? User interface mods are the answer, and Logan Booker has everything you need for PvE, PvP, raiding and more.

There are many ways to improve your World of Warcraft skills. If you're regularly playing a massively multiplayer online role-playing game – or MMORPG as it is known by the sunlight-deprived – chances are it's Blizzard's monumentally successful World of Warcraft. Based on the lore of the Warcraft universe, the seeds of which were planted years ago in 1994 by the original real-time strategy, WoW provides perhaps the most engrossing, polished and downright addictive online gaming experience known to man, short of being sucked into your PC to play laser Frisbee with a sentient program that dispenses Mars Bar every time you defeat it.

But your playing experience can always be improved and we're going to do just that with this guide, by taking a look at the wonderful world of interface modding. First though, we're going to explain a few concepts. That is, they're like pie, just like pie.

USER INTERFACING

You should already be familiar with game modding. If you're not, modding refers to the act of altering a game, be it making minor changes to enhance play, or creating full-blown new elements that can stand alone from the

original title. Customisation has always been the life-extending ambrosia for games – just look at the Half-Life mod Counter-Strike. It is the sole reason anyone plays the Valve's original FPS.

World of Warcraft is no different.

Well maybe a little. Its nature as a completely online game means that modification is limited to client-side only – that is, changes only you can see. This essentially means all we can play around with is the UI – user interface – to add more information, graphics and to a small extent, automation to our game experience.

Modding in World of Warcraft is based on a plug-in system, much like Photoshop. To add something to your UI, you need to download a mod package and install it into a directory under the main game. This directory can be found under Interface\Addons. Blizzard unfortunately does not supply a tool to install add-ons easily, so without a third party utility – more on this later – you'll have to create a folder and extract the mod package yourself.

Fortunately, WoW UI mods are based on the Lua programming language and have a fixed structure outlined by Blizzard, so other than extracting, no extra effort is required on your part to make them work.

ANATOMY OF A UI MOD

A WoW UI mod consists of the following components:

1. A file of Contents.toc (1024 KB). This file contains all the metadata for the mod, including dependencies, version information, the file list and so on. This is what WoW will read first.
2. One or more XML files. These files will have the file extension .XML and contain all the UI changes you've programmed. All files in the mod and are files that will do the work. They just have to be readable and therefore a text editor.
3. One or more additional XML files (up to 1024 KB). These files contain the visual elements of the mod. That is, the buttons, frames and textures the mod will use. Again, these files must be readable and therefore a text editor.

These are the essentials of a UI mod. Other files are usually included, such as Targa (TGA) images for use as graphics, readme files and additional programming libraries.

Once a mod has been installed, you can enable/disable it via the 'Addons' button found on the character selection screen after you log in to WoW. Other options are available on this screen and include a memory allocation field and a 'Load out of date addons' checkbox. For the memory field, the default value of 64MB should be plenty, but if you run a lot of UI mods, you may need to bump this up. The only time you should need to use the 'out of date' checkbox is after a new patch has come out and your mods have yet to be updated. While this will activate your mod in-game, there is no guarantee that they'll function correctly. For more information, see the 'Getting WoW 1.x mods working in 2.x' box on this page.

WHAT MODS CAN DO

The feature set Blizzard has exposed to the client-side is powerful while remaining limited to prevent exploitation. Perhaps the easiest thing a mod can do is alter the way unit frames look. Unit frames are the boxes that show you

GETTING WoW 1.X MODS WORKING IN 2.X

With the release of the 'Before the Storm' 2.0.1 patch – and the 2.0.3 patch that followed – most UI mods stopped functioning. But not necessarily because they were incompatible with the changes in the patch.

With the new patch, the mod detection routine in WoW simply checks each UI mod's internal version number, and if the version is less than 20000, renders the mod inoperative for 'safety' reasons.

While most popular mods have since received updates, it's possible that you're using a mod that isn't updated often, or at all, and haven't found a suitable '2.0.0' compatible replacement. If you're eager to get your old mod working, if only to see if it still works, you can do the following:

1. Browse to the Interface\Addons folder in your main WoW directory, and open the add-on you wish to manually patch.
2. Look for a file called ModName.toc, where ModName is the name of the mod.
3. Go to the line that reads '## Interface:' and change the number that follows to '20300'.
4. Save the file and start WoW.

If all goes according to plan, WoW will accept the mod as 2.0.0 compatible. There's no guarantee it'll work correctly so seek an update or replacement as soon as you can.

and your opponent's health and mana. By default, these boxes are latched to the top-left corner of the screen. A unit frame mod can make these movable, take up less space, and report additional information usually hidden for the sake of simplicity – such as your mana regeneration rate or the armour level of your enemy. Modding is not limited to unit frames – action bars, bag slots and more can be moved and rearranged.

Other mods take things a step further. By reading spell tooltips and your equipment/talent bonuses, a mod can directly alter the information that comes up when you mouse-over a spell in your action bars or spell book, and report back updated values – something Blizzard's UI does not do. This allows you to see, in realtime, just how much





additional damage a spell will do. This is especially good for spells that do not use 100 percent of your spell or healing damage and would be a pain to calculate on the fly yourself.

As you can see, UI mods are all about changing and improving the way you take in information from the game, and making it easier, or more efficient, to tell the game what it is you want to do. Once you get used to a good combination of mods, it can be hard to go back to the default UI.

WHAT MODS CAN'T DO

As flexible as WoW UI programming is, there are many things you can't do. Obviously directly altering values such as health or armour is not possible. Well, it is, but the changes will be purely cosmetic.

Earlier versions of the game allowed you to send keyboard commands and spell casts programmatically. This made it possible to make mods that would automatically move your character or cast a spell on certain events. This

feature has since been removed as it was possible to write 'bots' or computer-controlled players to automate tasks such as levelling.

If you're thinking UI mods might be a way to help you cheat, think again. Blizzard has been very careful in what is chosen to expose to the modding community. Although it is still possible to break rules in the game using UI mods, the rules you can break are fairly basic (your running speed for example) and will no doubt be picked up either by a Game Master or reported by another player and you run the risk of having your WoW account banned. WoW also features algorithms to detect 'banned' mod functionality and will either prevent the function from running, or stop the mod from loading altogether – as was the case with Decursive, a mod that automated the removal of negative buffs.

SUPERSEDED FUNCTIONALITY

Blizzard is continually updating its default UI to keep it 'competitive' with the modding scene and so has implemented usability into its UI that was once provided by the community. Such functionality includes:

- Scrolling combat text. By default, the Blizzard UI will not show events that occur to the player on-screen. A mod, called SCT, once provided this functionality, but has since been incorporated into Blizzard's UI.
- Automatic self-casting. The original spell casting defaults were a bit dumb. For example, in order to cast a spell on yourself, you would have to select your player and cast the spell. 'Selfcast' mods quickly appeared that allowed you to click the spell and, depending on certain variables – Is an enemy selected? Is a friendly player selected? Does the player have a mana bar? – cast the spell in the correct manner. Again, this functionality is now a part of the Blizzard UI and can be enabled via in-game menus.
- Action bars. This was a significant deficiency in the Blizzard UI. In earlier versions of the game, the player had just 12 buttons in which to assign commands, which for some classes was far from enough. As you can guess, mods came out to add additional action buttons and eventually action bars that could be moved, rearranged and coded to only show in certain circumstances. Blizzard added more bars and buttons to the interface but these bars cannot be moved or resized and so it's still prudent to use a third party action bar mod.

While mods still exist to implement the aforementioned



▲ To the left is Bongos, a mod that lets you move your action bars around and easily perform keybinds, while on the right is OneBag, which combines your bags into one frame.

IF YOU'RE THINKING UI MODS MIGHT BE A WAY TO HELP YOU CHEAT, THINK AGAIN.

now-default UI features, and in some cases, improve on them, you should be able to make do with what Blizzard has provided, the advantage being that you don't have to worry about updating these mods when new patches come out.

DEPENDENCIES

Mods can function alone but, like anything programmatic, good mods use libraries or 'dependencies' to improve efficiency and reduce size. Dependencies are mods that do nothing themselves but provide a set of functions that can be shared among mods and include Sea (found in Cosmos), Ace and others. Using mods that share a common library can provide memory and load time savings and reduce the chances of bugs. The disadvantage is that if the dependency is ever abandoned you're going to have to find replacements for all the mods that require it.

MODS, GLORIOUS MODS

With the basics covered, it's time to get on with the juicy stuff – the UI mods themselves. First, let's cover some of the complete UI mod packages available. There are many of these, so we're going to look at the more popular ones only.

COSMOS www.cosmosui.org

Cosmos is perhaps the first 'total' WoW UI mod package ever created. It consists of a number of mods written by the Cosmos team and provides for pretty much everything a user could need. Cosmos is both extremely popular and infamous for this fact. A simple browse through the UI and macro forums on the World of Warcraft website and you'll find post after post declaring Cosmos as 'bloatware'. This means that it's filled with unnecessary, or simply too many, mods. While it is the easiest option – it has its own installer and will have all the mods you need, no matter your class – chances are there will be many other mods it installs that you'll never use. It is also a headache to update due to its size and number of dependencies, and often the Cosmos team will release 'alphas' of the package until all the mods have been patched.

NURFED UI www.nurfedui.net

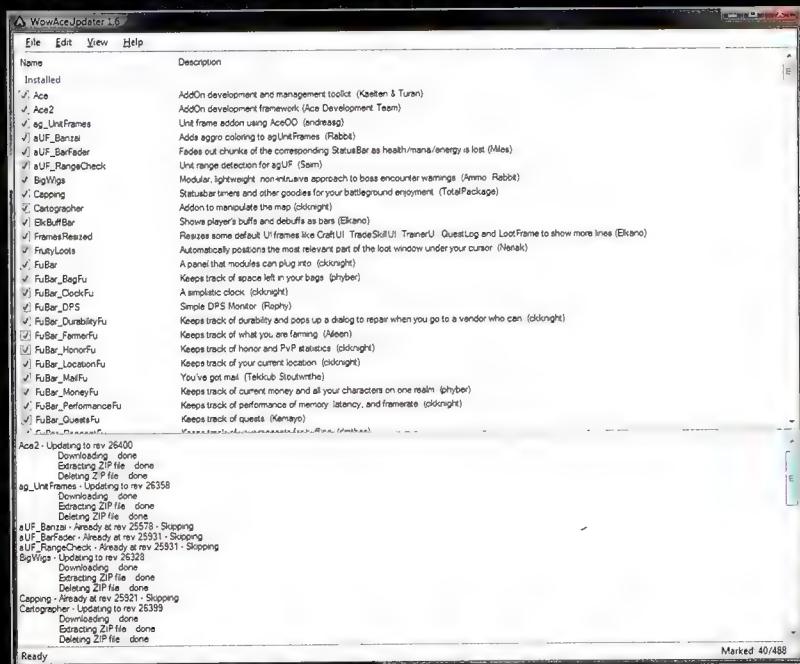
Nurfed UI is similar to Cosmos in that it provides a combination of mods in the one package, however Nurfed UI draws its mods from the community at large, rather than a dedicated team. Nurfed is also considered less bloated than Cosmos and thanks to the larger mod resource, has the cream of the crop of UI mods. The disadvantage to

Nurfed is that if a mod is abandoned, it has to be replaced or removed, which can be a pain if you've become reliant on a certain mod.

While the package isn't as up-to-date as it used to be, it looks like there will be a Burning Crusade-compatible version of it available if you want to check it out.

CTMOD www.ctmod.net

While CTMod contains its own unit frame and action bar mods among other things, most players only use the CT_RaidAssist and CT_BossMods packages, combined with Discord or their own personal preference for everything else. CT_RaidAssist provides configurable raid unit frames, main tank windows, emergency windows and other things that come in handy during a 40 or 25-man. CT_BossMods contains a list of all the current raid dungeons and bosses, and provides 'warning' support to instruct when bosses will perform certain moves or change phases. It is considered indispensable by most guilds and as such, if you're going to



► If you decide to use mostly Ace mods, AceUpdater is essential. Instead of manually updating your mods, you can just run AceUpdater. It will not only check for new versions, but download and install them for you.



raid, you'll be ordered by your guild to download this mod and probably CT_RaidAssist. Don't worry though – competent and dare we say better alternatives are available.

DISCORD MODS www.discordmods.com

Discord is again much like Cosmos, except the focus is kept to just a select few facets of the UI – the two main mods in the package being Discord Unit Frames and Discord Action Bars. Both are independent of each other.

Discord is a UI modder's dream, allowing for a huge amount of customisation. Unit frames can be created from scratch to suit your needs, buttons scaled and broken off action bars, textures replaced and more. It's updated often and is a popular, if daunting, choice.

ACE www.wowace.com

ACE isn't so much a UI package as it is a set of libraries, but is worth mentioning considering that many popular mods use it and, most of the mods we're about to talk about use it.

With Ace, all of WoW's UI functionality is streamlined into an easy-to-use command set, which helps to abstract the UI coder from changes to the WoW UI internals. The creators of the libraries are also focused on designing low-profile and efficient mods. If there's a popular UI mod available, you

can be sure there's a better coded Ace alternative.

Atomic is a big fan of Ace mods and because of this we're going to recommend it to anyone who wants to customise their interface. The Ace community is unbelievably self-sufficient and organised, even providing its own autopatcher for every single Ace mod that's 'officially' supported by the website. You can grab the updater from Sourceforge here: sourceforge.net/projects/wowaceupdater. At the time of writing, the latest version was 1.6 final.

Sadly, Ace does not provide for everything, so we've split the mod recommendations into non-Ace and Ace. Most, if not all of these mods have been used personally by us.

NON-ACE MODS

These mods do not require Ace or Ace2 to function, and must be manually updated by visiting their pages on Curse Gaming or WowInterface.

BONGOS

www.curse-gaming.com/en/files/details/2003/bongos

Bongos is fast becoming one of the more popular action bar mods, and we consider it to be the most configurable while remaining lightweight and manageable. Bongos provides movable action bars that can be individually scaled and rearranged. A menu option allows you to bind keys on the fly and an intelligent docking system lets you connect bars together or to other elements of UI and drag them around as a group. The mod also provides replacements for the XP bar and cast bar, and makes the minimap, game menu toolbar and bag bar movable.

While not as good as the venerable – but now abandoned – Bibmod, it is excellent nonetheless.

DRAGQUEEN

www.curse-gaming.com/en/files/details/2580/dragqueen

With Bibmod abandoned and MoveAnything! far too cumbersome, DragQueen is a simple solution to a simple request: Make my windows movable. By default, the Blizzard frames for the character, bag and talent windows are fixed in one place. With DragQueen you can move them around, which is much more natural for a UI. Unlike Bibmod, DragQueen will not 'save' the position of a moved window and if you close and reopen a frame, it will reappear at its original position to the far left of the viewport. Keep this one up-to-date, as The Burning Crusade introduced new frames that older versions of DragQueen may not recognise.



Cartographer is a fantastic Ace-based mod that allows you to completely customise your world map.

NON-ESSENTIAL ACE MODS

The following is a quick list of other mods you can try that aren't necessarily 'must-haves', but are useful or cool anyway.

Baggins Allows you to create virtual bags. A bit of a compromise between Blizzard's default inventory and OneBag.

FruityLoots Auto-positions the loot window at the cursor. Not required if you have auto-loot enabled.

GrindStatus Show reputation grind bars, as well as reputation rewards and hand-ins. Not essential as the Blizzard UI allows you to replace your XP bar with a reputation bar.

Nvp Shows PvP rewards and their associated honour/token cost, saving you having to travel half-way across Azeroth.

FarmerFu A plug-in for FuBar that lets you track item counts in your inventory. Good for grinding.

Combine Currently in development, but looks like it'll be an excellent guild/raiding tool. The included raid calendar will be a must-have.

GonffBar Energy tick rate bar for rogues and druids so you can time the perfect combination of moves.

ChatLog Improves chat log memory, history and reloads logs after disconnect.

DruidBar Creates a mana bar while in forms.

SimpleCombatLog Simplifies and expands the combat log options and display, makes it easier to see when you hit and how much damage you did.

GotWood Tracks totems for Shamans.

WOWECON

www.wowecon.com

Wowecon is a continuously updated 'sell value' mod that will show you in a item's tooltip its value if sold to a vendor and the average value if placed on the auction house. The mod even shows what reagents the item will disenchant into, and the average value of those reagents. Great for the grind when you find an object you've never seen before or trying to decide which grey and white items you should ditch when your bags are full. It also comes with a Lootlink-like database so you can search for items and their details. Wowecon requires the use of an external executable to update the pricing information, which also serves to update the mod itself.

SPELLTIPS/THEORYCRAFT 2

www.wowinterface.com/downloads/info6079-Spelltips.html
www.curse-gaming.com/en/files/details/5360/theorycraft-2

Both SpellTips and Theorycraft provide the same base functionality – taking your spell and healing bonuses from talents, items and trinkets, and factoring it into your spell tooltips. SpellTips is lightweight and low on configurability but finished and reliable, while Theorycraft 2 comes with options galore, but is currently beta and not always dependable. There's an Ace alternative, called DrDamage, but it's fairly new and at the time of writing doesn't include support for druids.

OMNICC

www.curse-gaming.com/en/files/details/2775/omni-cooldown-count

Cool-down counters are a gold a dozen, but only OmniCC caters for almost all the action bars out there, including



Behold the in-game Addon options screen. From here, you can enable and disable mods for different characters.

Bongos, Discord, Trinity and more. A cool down counter keeps track of item and ability cool downs and overlays numbers onto your action bar and inventory spaces so you can see, to the second, how long until you can reuse that item/ability. OmniCC allows you to customise the countdown, including fonts, the size of the 'flash' when the cool down is finished and a bunch of other things.

SW STATS

www.curse-gaming.com/en/files/details/2091/sw-stats

Recap was a fantastic mod with an excellent, easy to use interface. The last time Recap was updated however was 37 years ago (according to Curse Gaming, more like a year) and although a few have taken the code and created clones, it's not the damage meter mod it used to be. Enter SW Stats, which took the crown of damage meter king and ran with it. Now it's the default.

Damage meters track how much damage and healing you and your raid/group do. Its main purpose is for bragging rights, but it's also good to test the damage per second (DPS) and healing power of different equipment configurations.

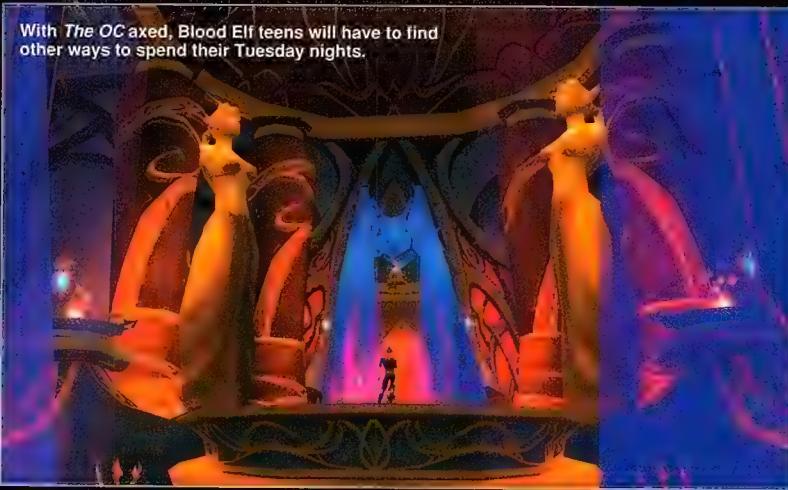
ACE MODS

These mods use Ace, or the embedded Ace2. Using WowAceUpdater you can automatically update these mods to their latest version. To install these mods, just grab the updater (sourceforge.net/projects/wowaceupdater), run it, mark the checkboxes of the ones you want and hit F12. Easy.

AG_UNITFRAMES

A mod with a long history. Originally developed without Ace as Minigroup, then with Ace as Minigroup2, and finally Ace2 in this incarnation, ag_Unitframes is a lightweight yet highly configurable set of group and raid unit frames. A recent update has seen the inclusion of an attack targeting bar for enemies, so you can do without mods like Antagonist if this is all you're after. ag_Unitframes also includes support for raids, but without nifty features like range checking. Like other Ace mods you can select between different bar styles so you can properly match up your UI mods.

To access its advanced configuration options type 'ag_Unitframes config' into the chat window.

**oRA2**

oRA2 serves as a replacement for CT_RaidAssist, minus the raid frames. Basically it will interpret calls from CT_RaidAssist, so as far as CT_RaidAssist users are concerned, you're using the same mod. oRA2 is significantly smaller and faster than CT_RaidAssist and is the perfect alternative if you're crazy about efficiency. It's recommended you also grab BigWigs and sRaidframes (though the latter is not essential).

BIGWIGS

BigWigs is a replacement for CT_BossMods, but includes a plug-in system to add additional features. The base BigWigs has support for all major boss fights in the game, and can interpret calls from CT_BossMods. The great thing is you can use oRA2 and CT_BossMods, or CT_RaidAssist and BigWigs, and it'll work just fine. Like oRA2, BigWigs is coded with the Ace community methodologies in mind, and is much smaller and more efficient than its CTMod counterpart.

ONEBAG, ONEBANK, ONERING

Whether you install the 'One' series of mods is really down to personal taste. World of Warcraft departed slightly from the 'single inventory' system in Blizzard's other RPG Diablo, and replaced it instead with multiple bags. This is great for organising, but a nightmare if you're trying to find one item in your bag. OneBag, using the native bag functionality in the WoW UI, connects all your bags together into one big bag. It's many times smaller and less prone to bugs than AllInOneInventory, which hacks together its own bag-litching code. For the old-school RPG player, it's a must-have. OneBank duplicates this functionality for your bank, while OneRing does it for your keyring.

FUBAR

FuBar is similar in operation to Titan Panel, providing a thin bar or bars that show basic information such as honour, durability and inventory space where it can be seen easily. These numbers are provided via plug-ins, and some mods can include a FuBar plug-in to provide quick access to their configuration menus. By itself, FuBar does jack-all, so we recommend downloading the following plug-ins:

- LocationFu: Shows your current location and your coordinates, and also provides instance, zone and quest info via its tooltip.
- HonorFu: Provides a display showing your estimated

honour, honourable kills, and victories/losses in each battleground.

- ClockFu: A basic clock with time zone settings.
- RegenFu: Shows your mana and health regeneration rates, and provides a countdown bar for the five-second rule.
- MoneyFu: Displays your gold, silver and copper. The tooltip provides additional info, showing how much money you've made and lost that day and for the entire week, as well as gold made per hour.
- ItemBonusesFu: Tallies all your item bonuses, including stats, critical strike ratings, dodge ratings, healing and spell power, and displays them in a tooltip.
- DurabilityFu: Provides the total durability of the items you're currently wearing as a percentage, based either on the item with the least durability or an average of all items.

There are loads more plug-ins for FuBar, all of which can be accessed via the Ace Updater.

CARTOGRAPHER

An essential mod for the battleground player, replacing the basic dots on the battleground map with numbers in coloured circles – the numbers representing which group the player is in, and the colour their class. This functionality also works outside of battlegrounds. Cartographer also lets you customise the scale, opacity and position of the world map and allows you to write map notes marked by unique symbols. This mod is quite large as it includes instance maps with important areas marked, and supports a plug-in system to expand its options. Check out the Ace Updater for a list.

ANTAGONIST

Not a required mod with the recent change to ag_Unitframes, but if you want to know what the cool downs are on your opponent's abilities and the time left on their buffs, look no further. Antagonist also adds a movable enemy casting bar, and can be configured via chat box switches.

ELKBUFFBAR

Replaces the default Blizzard buff frame with a custom frame that reduces the buff icon sizes and straps a timer bar to them. The mod has configuration options that allow you to scale, resize and move the buff frame and provides a more 'at a glance' set of timers for your buffs and debuffs. Includes buff/debuff sorting as well.

CAPPING

Another must-have mod for the battleground enthusiast, providing skinnable bars for flag, tower and graveyard captures, as well as an estimated 'time-to-win' counter for Arathi Basin. Capping has the ability to output times to the chat window, and can display queue wait times, portal times and other useful countdowns as bars on-screen.

sRAIDFRAMES

An incredibly configurable set of dedicated raid frames that can, if you want them to, be made to look identical to CT_RaidAssist's frames. In addition, sRaidframes can change the transparency of players outside of a certain range making BG healing a breeze; show on their unit frame when a character is stealthed or in shadowform; grow groups in any direction and it shares bar skins with



most other Aces mods. sRaidframes however does not completely replace CT_RaidAssist – you'll need to grab oRA2 as well.

WARDROBE2

A great mod for classes who need to carry around multiple sets of gear... druids and warriors being prime suspects. With Wardrobe2 you can assign your current gear setup to a name, and then select that name to re-equip that gear set. This mod includes a FuBar plug-in, so if you're using FuBar it's even easier to use. An option is also available to set an equipment set for when you're mounted, but we couldn't get it to work correctly during play.

oCB

A nicer looking cast bar with a timer. It's not a complex mod, but if you're going heavy with the Ace stuff, oCB matches the 'feel' of most Ace mods. The only gripe we have with this mod is that there doesn't appear to be an 'show anchor' option so positioning it requires you to be casting a spell – using your Hearthstone should do the trick.

TINYTIPS/LITHTHE_TOOLTIPDOCTOR

Both mods provide the same functionality, but TinyTips has more options. Basically, if you want to reposition your tooltip, these mods will do it for you. LTD is simple in operation and extremely lightweight, while TinyTips lets you reconfigure how the tooltip looks and what it says, and includes limited plug-in support. LTD is not maintained by the looks of things but works fine, so don't be afraid to use it until a patch decides to break it.

MOBHEALTH3

Provides an estimate of an opponent's health, based on the amount of damage you do. By default, the mod will sample 10 hits before showing a value, but this can be changed to just one if you want it straight away. According to the author the estimate is mostly accurate when set to 10, so either keep it as it is or, if you're impatient, lower it a few notches. Two versions of this mod exist – one for custom unit frames like ag_Unitframes and one for Blizzard's default frames.

VOYEUR

Put simply, this mod extends the range you can inspect other players, and also shows their guild and level in the character window. Due to internal changes by Blizzard, no 'inspection' mod can see what items an opposing player is wearing.

POPULAR LAYOUTS

Now that you're armed to the teeth with World of Warcraft mods, it's time to configure them. Depending on what you went with, this can take 10 minutes, two hours or the better half of a century. Keep in mind that WoW updates often 'break' setups so don't do anything exceptionally complicated that's going to have you crying every time Blizzard releases a new patch. That said here's a list of the more popular layouts.

Default: Everything is positioned the same way as Blizzard's default interface. All you're doing is 'upgrading' it with mods that have more functionality. This will give you the least amount of downtime during WoW updates, but doesn't really take advantage of the fact you're using mods.

Centre: Player and enemy unit frames in the centre, with action bars on the sides or around the edges. Forgoes the use of party frames, using a raid frame instead. Space-saving but takes some getting used to.

Centre-heavy: Places buttons in the centre of the screen and 'fans' them out to the chat windows. Like the centre layout, the unit frames are placed in the middle-bottom of the screen so you don't have to move your eyes far to see your health and your opponent's. Minimap is sometimes placed directly in the middle and elements are fanned around that instead.

Bottom-heavy: A UI style that favours placing most elements at the bottom of the screen, excluding one or two objects such as the player frame or buff frame. This gives you plenty of space up top for raid frames and the viewport.

Minimalist: Shrinks and hides least-used or unused frames, making as much space as possible available for the viewport and raid frames. Good for DPS classes that don't require a great deal of situational awareness, but healers would be better off with one of the more object-heavy layouts.

Top-heavy: Buttons and some unit frames are attached to the top of the screen. Not a bad layout, but due to the way some mods overlay rather than push the screen down, you can end up obscuring your view. This is the reason why bottom and centred layouts are preferred.

Side-heavy: Most buttons and unit frames are distributed around the screen, leaving a centre 'circle' clear for viewing. Again, not a popular layout (it duplicates the default layout somewhat) as the bottom of the screen usually contains a big wad of ground that could be used for frames and bars.

PUT THE 'U' IN UI

In this guide we've covered most of what you need to know about modding your World of Warcraft user interface. What we haven't touched on is making your own – something that's fairly in-depth and would require the entire magazine to cover – and the configuration options of each mod, but most come with decent documentation. If you're in doubt, just go to the chat window and type a forward slash, followed by the full name of the mod. This should bring up options for it. Also check the minimap for new buttons.

If you'd like to learn more about UI mods, check out Blizzard's official UI and macros forums at forums.worldofwarcraft.com/board.html?forumId=11114&sid=1 or visit WowAce at www.wowace.com.





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08 8231 7588 www.itforus.com.au

QLD

Computer Alliance
Game Dude Computers

Dreamworks IT
Umart Online

07 3421 3200 www.computeralliance.com.au

07 3387 1500 www.gamedude.com.au

07 3396 0544 www.dreamworks.com.au

07 3369 3928 www.umart.com.au

WA

Austin Computers
Trinix Computers
YNOT Computer Systems

08 9201 2788 www.austin.net.au/index.asp

08 9350 1600 www.trinix.com.au

08 9330 7666 www.ynots.net.au

Premium Resellers

VIC Centre Com 1300 007 600 www.centrecom.com.au
Computers & Parts Land 03 8542 8688 www.cpl.net.au
MSY Technology Pty. Ltd. 03 9560 2288 www.msy.com.au
Scorpion Technology 1300 726 770 www.scorptec.com.au

HARDCORE

NEWS, REVIEWS AND ROUNDUPS ON THE LATEST HARDWARE

Geez, what a long haul this month has been. Testing the overclocking abilities of 14 Core 2 Duo motherboards is no easy feat, with around 2-3 hours needed to properly assess each board's abilities. Whip over to page 42 to find out what your future board should be.

We also have an eclectic bunch of reviews this month – from the inter-

esting Sony DVDirect, through to Dell's 30" refresh, power supplies and Razer's new super mouse.

Of course we have the usual Gearboxen, Hotboxen, Kitlogboxen and UberDanRutterBoxen for your perverse perennial perusal. And no, we're not German.



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Compaq 3800675 58

10 Noctua NC-U6s to be won!

www.atomicmpc.com.au/competitions

We all like our PCs to look like miniature cities on the inside, and adding Noctua's NC-U6 to your northbridge will aid this noble goal with style. Thanks to the shiny people at Nintek (www.nintek.com.au), we have 10 of these silent towers to give away. Now you can stay warm and fuzzy while your northbridge stays cool! To be in the running, just visit the competitions URL above, click the Noctua link and answer the question you find there.



BENCHMARK

How we test,
what we test,
when we test it

3 DMarks 05 and 06 are the legs of our bench. As freely downloadable tools, they allow people all around the world to compete on a single platform, regardless of its indication of real world application, and its ability to keep our table stable.

On the gaming surface, Call of Duty 2 takes first honours in the FPS department. Quake 4 follows closely behind for our OpenGL benchmarks, taking over from where the venerable Doom 3 left off and offering multiple CPU optimisations. Half-Life 2 remains, its market penetration simply too huge to ignore. X3: Reunion makes an appearance, in an effort to have a benchmark that is not an FPS. In the same line, Splinter Cell: Chaos Theory has also been added. Other games do exist. Honest.

All tests are run at 1280x1024, 1600x1200 and 1920x1200 with vsync off, to cater for the most popular LCD resolution, CRT resolution and those who own widescreen monsters respectively.

To hit the CPU, we use LAME MT, a multithreaded version of the



The **Atomic Hot Award** is given only to the best. In our roundups, we differentiate the best further using the following awards:

VALUE AWARD This means the product is the best buy price-wise.

PERFORMANCE AWARD Price isn't a big factor – it just has to make our benchmarks burn and our eyes water.

EXTREME AWARD Forget everything. If it's *mind-blowingly amazing*, then it'll get an Extreme Award.

popular MP3 encoder, which is used to compress a standard 30-minute WAV file. Similarly, VirtualDubMod is used to compress a standard 1GB raw video file into XviD at 1300Kb/s. Other CPU specific tests in our stable are Maxon's CineBench and SuperPi Mod. Rounding out the suite, SiSoftware's Sandra tests several subsystems across the board, while HDTach and ATTO Disk Benchmark helpfully provide hard drive scores.

All these tests are run on a Windows XP SP2 platform, running the latest official drivers available. Every test is run three times to eliminate any oddities that may crop up along the way, the final result printed in the magazine being an average of those scores.

Of course, all this is pointless without a standard set of hardware, and as such it is laid out below for the world to see. On with the testing!

BENCHMARKS

Graphics

3DMark05

Game tests only, 4xAA, 8xAF
www.futuremark.com

3DMark06

Game tests only, 4xAA, 8xAF (SM2.0), 8xAF (HDR/SM3.0)
www.futuremark.com

Half-Life 2

Canals custom timedemo, 4xAA, 8xAF, all details highest, HDR off
www.half-life2.com

Splinter Cell: Chaos Theory

Lighthouse Demo, Shader Model 3.0, 8xAF, shadow resolution high, all features on
www.splittercell3.com

X3 Rolling Demo

High settings, auto quality control disabled, glow enabled, 4xAA, 8xAF
www.egosoft.com/games/x3/info_en.php

Call of Duty 2

Hill 40 – Defend custom timedemo, 4xAA, 8xAF, all options highest
www.callofduty2.com

Quake 4

High quality, 4xAA, 8xAF, Multiple CPU support, all options highest
www.quake4game.com

Subsystems

HDTach

www.simplisoftware.com

LAME MT

softlab.technion.ac.il/project/LAME/html/lame.html

VirtualDubMod

virtualdubmod.sf.net

SuperPi Mod

www.xtremesystems.com/pi

Cinebench

www.cinebench.com

SiSoft Sandra

www.sisofware.co.uk

Everest

www.lavalys.com

Others

DisplayMate

www.displaymate.com

ATI Tool

www.techpowerup.com/atitool

RivaTuner

www.guru3d.com/rivatuner

FRAPS

www.fraps.com

CPU-Z

www.cpuid.com

Stress Prime 2004 Orthos

sp2004.fre3.com

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▲ Intel Core 2 Duo X6800

EVGA



▲ EVGA 680i SLI

OCZ



▲ 2GB OCZ Flex XLC PC2-9200

Western Digital



▲ Western Digital 1500ADFD

PC Case Gear



▲ Seasonic S12 600W

AMD



▲ AMD Athlon 64 FX-62

ASUS



▲ ASUS M2N32-SLI Deluxe

OCZ



▲ 2GB OCZ Flex XLC PC2-9200

DELL



▲ Dell 2405FPW

ASUS



▲ ASUS 8800GTX

GIGABYTE Intel Quad Core ready motherboard



Intel Quad Core optimized motherboards from GIGABYTE feature solid caps (capacitors) that are more durable than normal electrolytic caps

Without a doubt, solid caps will be one of the hottest (pun intended) new features on high-performance motherboards as PC users look for maximum longevity from their upgrade to Intel Quad Core optimized systems and Windows Vista. As the current performance leader, Intel quad core processors are the CPU of choice for most power users who push their motherboards (and capacitors) to the limits. GIGABYTE is raising the bar for motherboard quality and reliability by using expensive Japanese solid caps on a full range of mainstream to enthusiast motherboards.

What is a capacitor?



Solid Capacitor



Electrolytic Capacitor

Capacitors store electricity for other components on the motherboard and discharge it when needed. Solid capacitors contain a solid organic polymer, while electrolytic capacitors use a common liquid electrolyte.

Six times longer lifespan

At 65°C, the average lifespan for solid caps is more than six times longer than that of an electrolytic cap. This translates into around 23 years for solid caps and a mere 3 years for electrolytic caps.



Improved tolerance for high frequencies & temperatures

Solid capacitors have more tolerance than electrolytic capacitors for high temperatures, high frequencies and high current. In essence they have lower impedance (how much the capacitor impedes the flow of current) and generate less heat so they operate better under stressful conditions – this not only leads to a longer life span, but also increased stability and performance.

No more exploding capacitors

Today's PC enthusiasts and power users place increasing demands on their motherboards and hence, capacitors. Normal electrolytic caps have been known to bulge or swell, and in some cases leak fluid or explode/pop under constant stress, dramatically lowering system performance or worst case, damaging the motherboard.

As there is no liquid in the solid caps used on GIGABYTE motherboards, they don't leak or explode.



GIGABYTE Ultra Durable motherboards

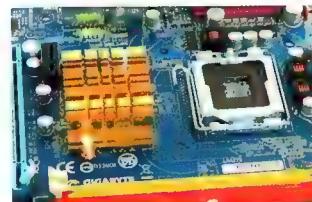


* Certified for Windows Vista Premium meets Microsoft Windows Vista Premium requirements.

* For more information about the Certified for Windows Vista™ Premium models, please visit GIGABYTE website.

Ultra Durable motherboards from GIGABYTE are easily recognizable by the 'D' in their suffix. E.g. GA-965P-DQ6 or GA-945P-DS3. They cover the full spectrum of users from extreme enthusiasts using Intel quad core CPUs to mainstream users. In fact, GIGABYTE is the first motherboard manufacturer to adopt all-solid caps on a full range of 945 chipset motherboards as well as on all higher-end products to deliver maximum stability, reliability and longer system lifetime for the ultimate PC gaming and entertainment experience.

Solid Caps on GIGABYTE Quad Core Optimized Motherboards



Electrolytic Caps on other Motherboards



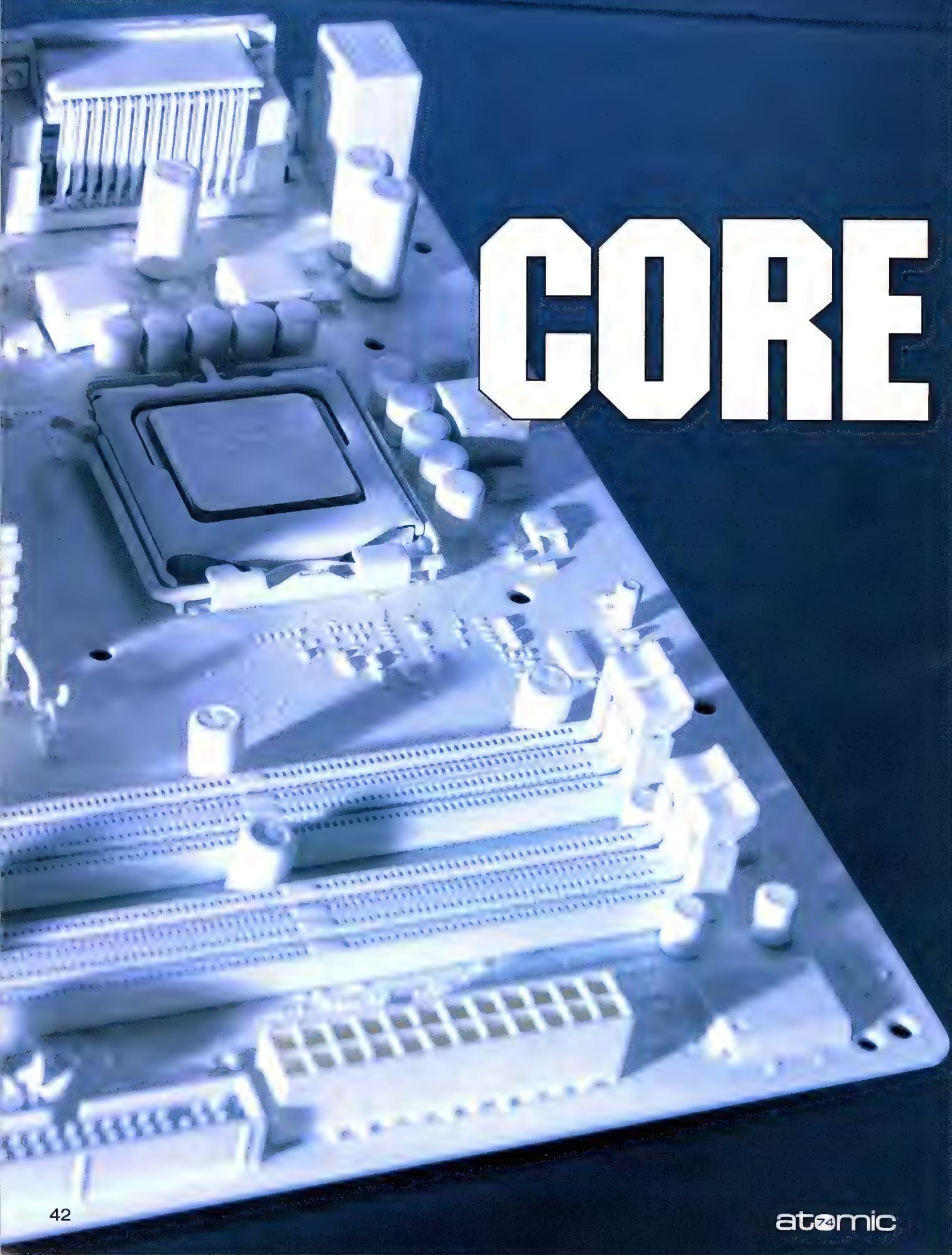
For more information on GIGABYTE Ultra Durable motherboards please visit the GIGABYTE website at:

<http://www.gigabyte.com.tw/Products/Motherboard/Default.aspx>

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HARDCORE

CORE



OVERLOAD

Craig Simms overclocks 14 Core 2 motherboards. The results of his insane but spectacular testing can be found here.

The Core 2 market has had a while to stabilise and so *Atomic* figured it was high time to pull out our motherboard testing fingers and round up those boards on the market that had gained themselves a reputation.

While we performed the usual battery of tests, it was very clear that all these boards were just going to return the same performance values with our X6800, OCZ Flex XLC PC2-9200 RAM and 8800GTX – at least within an insignificant margin of error. If ran at stock, 3DMark06 SM3.0 would inevitably throw back around 3500 points, Sandra Memory Bandwidth tests around 5700MB/s and SuperPi came in at around 1 minute 41 seconds. In light of this, we instead decided

to focus heavily on how far we could push the FSB of each board, and which would give us a sense of how overclockable each model was, and consequently give us some kind of comparison.

Four chipsets were included in the roundup – NVIDIA's 680i and 650i, and Intel's 975X and P965. While we would have loved to have included DFI's ICFX3200T2R/G and hence given AMD/ATI's final Intel chipset a run, it just wasn't ready in time. Plus, while the 945s will handle Core 2, these should be considered as very much entry level, and hence not suitable to the round up.

Flexing our overclocking muscles, we delved into the labs to see if we could crown a clock king.

Motherboard FSB overclockability (higher is better)



How we tested

Some of these boards broke the coveted 500MHz FSB mark, but they certainly weren't stable at that level. In fact, you'll see numbers here that may be lower than other reviews, simply because most reviewers push the board as fast as it can go without regards for stability. As long as they can boot CPU-Z and grab a screenshot for street cred, they're happy, but the machine ends up being unusable – impressive but ultimately quite futile.

For us, stable means four completed tests using the Stress Prime 2004 Orthos Edition (sp2004.fre3.com/beta/beta2.htm) 'blend' test, to strain both memory and CPU simultaneously.

Following the logic that most people will buy lower-end CPUs to overclock them, we set our X6800's multiplier to 6x while overclocking, allowing us to ramp the FSB as high as possible.

We tried to keep the RAM at a 1:1 ratio and the voltages at a stock

level for as long as possible, but ultimately an 'anything goes' policy was adopted to see how far we could push the systems without causing damage or causing instability.

Interestingly, not a single board in the roundup featured active cooling – heatpipes and passive sinks are now part of the norm as the public has come to expect power and silence in our computing. About time!

On the flip side, while these are generally quite good solutions if you intend to massively overclock it may be worth investing a little bit of cash in some custom northbridge cooling – although this will admittedly require some creativity on the heatpiped boards.

If you're going to buy a board and run it at stock levels, then obviously anything featured here is fine, assuming the feature-set meets your needs. SLI enthusiasts will need a 680i/650i, CrossFire should probably go 975 (965 is slightly hobbled in this regard due to a reduced number of lanes fed to the second slot) and those looking for better memory management should hit the 965. On with the tests!

ASUS P5N32-E SLI Plus

Price **\$349** Street Price **\$338** Supplier **ASUS**

Website www.asus.com.tw

Chipset **680i + C55** Max CPU voltage **1.6**

Max DDR voltage **3.425**

The P5N32-E SLI is ASUS' mid-level stab at the 680i. Unfortunately there's one thing holding the board back – the northbridge gets amazingly hot, and needs active cooling in order to overclock. Even more unfortunately, it doesn't come with active cooling, so we used a high-powered 120mm fan to cool the NB and get the overclocking result we did.



EVGA 680i SLI

Price **\$430** Street Price: **\$419** Supplier **Shadow**

Website www.shadowentertainment.com.au

Chipset: **680i + C55XE** Max CPU voltage: **1.8**

Max DDR voltage: **2.5**

This is the reference 680i board, and it's still excellent. Interestingly, it is now being outperformed by second generation 965 boards in the overclocking stakes. A reset and power button onboard make this nice to deal with, but the battery is a bugger to remove. Definitely the board to get if you need SLI – otherwise we'd suggest one of the new revision P965s.



ASUS P5N-E SLI

Price: **\$229** Street Price: **\$219** Supplier: **ASUS**

Website: www.asus.com.tw

Chipset: **650i** Max CPU voltage: **1.6**

Max DDR voltage: **2.517**

The P5N-E SLI was one of the more interesting beasts in the roundup. As the only 650i board on the market, we can see why NVIDIA wanted to turn all attention to its older brother. The SLI hardware switch makes an unwelcome return, and a very basic BIOS and ordinary overclockability makes this one hard to recommend.



MSI 975X Platinum PowerUP Edition

Price **\$249** Street Price **\$247** Supplier **MSI**

Website www.msi.com.tw

Chipset **975X + ICH7** Max CPU voltage **1.58**

Max DDR voltage **2.4**

This board did not detect our USB key for firmware updating through DOS, but the Windows update worked like a charm. The PowerUP neither steps a foot wrong nor stands out from the crowd, its overclockability acceptable for a 975X series board. Frustratingly it still follows MSI's botched DDR slot colour coding, which is confusing for setting up dual channel.



ASUS P5W DH Deluxe WiFi

Price **\$429** Street Price **\$358** Supplier **ASUS**

Website www.asus.com.tw

Chipset **975X + ICH7** Max CPU voltage **1.7**

Max DDR voltage **2.4**

We expected big things out of the overclock on this board, due to the online buzz surrounding it. Unfortunately, we didn't get them. To be mentioned is ASUS' excellent way of giving back live RAM speeds associated with ratios in the BIOS, and a firmware update means the onboard sound is ready for Vista as well. Still, we'd look at Intel's option first.



Intel BX975XBX2

Price **\$TBA** Street Price **\$320** Supplier **Intel**

Website www.intel.com

Chipset **975X + ICH7** Max CPU voltage **1.6**

Max DDR voltage **2.8**

This baby shows Intel knows how to make its boards better than anyone else. With an excellently featured, if somewhat unfamiliar BIOS at first, this 975X ripped past even the premium offerings from other companies in the overclocking space. If you want 975X, get this board. The only downside is it might be a bit hard to obtain unless you go OEM.



ABIT AW9D-Max

Price **\$349** Street Price **\$314** Supplier **Altech**

Website www.altech.com.au

Chipset **975X + ICH7** Max CPU voltage **1.725**

Max DDR voltage **2.65**

The Max is an impressive looking board with the usual elementary layout mistakes made by ABIT. Two SATA ports, an FDD port and power connector sit at the bottom of the board, wreaking havoc for cabling. Solid capacitors are a nice touch, it's just a shame about the blingy lights – which can fortunately be turned off.



Gigabyte GA-965P-DS3P rev2.0

Price **\$TBA** Street Price **\$226** Supplier **Gigabyte**
 Website www.gigabyte.com.tw
 Chipset **P965 + ICH8R** Max CPU voltage **2.375**
 Max DDR voltage **2.575**

The DS3P differs from its smaller brother the DS3 in four notable ways – two extra SATA ports; FireWire; the ICH8-R southbridge allowing RAID 0, 1, 1+0 and 5; and a second PCI-E x16 slot for CrossFire. What it retains is the DS3's legendary overclockability, nearly taking the top score. The only downsides are the few accessories and the absence of a clear CMOS jumper.



Gigabyte GA-965P-DS4 rev2.0

Price **\$TBA** Street Price **\$269** Supplier **Gigabyte**
 Website www.gigabyte.com.tw
 Chipset **P965 + ICH8R** Max CPU voltage **2.375**
 Max DDR voltage **2.575**

The DS4 is the DS3P, except with Gigabyte's 'SilentPipe' heatpiping wrapped around the CPU area. Unfortunately this didn't translate to extra headroom on the FSB, but the DS4 is still right up there with the DS3P. Solid capacitors like its sibling mean this is a good choice for longevity. Accessories are light on here as well. Downsides are similar to the DS3P.



MSI P965 Platinum

Price **\$199** Street Price **\$187** Supplier **MSI**
 Website www.msi.com.tw
 Chipset **P965 + ICH8R** Max CPU voltage **1.9875**
 Max DDR voltage **2.45**

Unfortunately MSI gets the wooden spoon in terms of overclocks here. The layout and performance is fine, but it just doesn't overclock far at all. When we did push it beyond stable the system wouldn't restart properly, requiring us to remove power completely before it would reboot again. If you don't intend to overclock, then the MSI represents a sound choice.



ASUS P5B Deluxe Wi-Fi

Price **\$379** Street Price **\$301** Supplier **ASUS**
 Website www.asus.com.tw
 Chipset **P965 + ICH8R** Max CPU voltage **1.7**
 Max DDR voltage **2.45**

Despite its age, the original P5B proved itself worthy of the adulation it has received online, only just being beaten out by Gigabyte's new revision 2.0 offerings. The only complaint is the clear CMOS jumper is positioned under the first graphics card, making it a bastard to reset. Accessories are plentiful, and a non Wi-Fi edition is available should you wish to save a few dollars.



Gigabyte GA-965P-DQ6 rev2.0

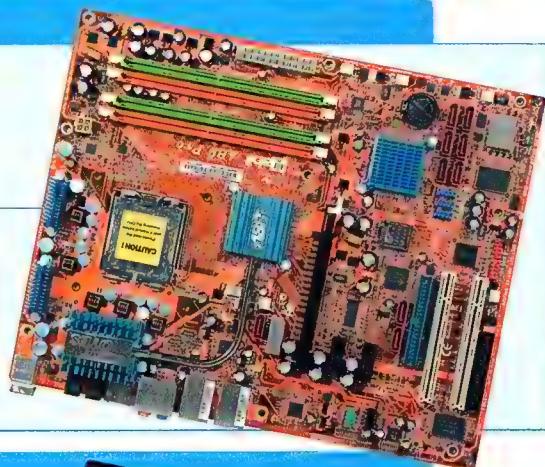
Price **\$TBA** Street Price **\$331** Supplier **Gigabyte**
 Website www.gigabyte.com.tw
 Chipset **P965 + ICH8R** Max CPU voltage **1.975**
 Max DDR voltage **2.575**

This is Gigabyte's flagship motherboard at the moment, and while it looks the part, it doesn't manage to keep up with its cheaper siblings as far as overclocking goes. While it managed an Orthos stable 485MHz FSB, it wouldn't reboot properly until we clocked back down to 440, so the score is conditional. A BIOS update might fix this, but we can't recommend it.

**ABIT AB9 Pro**

Price **\$220** Street Price **\$214** Supplier **Altech**
 Website www.altech.com.au
 Chipset **P965 + ICH8R** Max CPU voltage **1.725**
 Max DDR voltage: **2.65**

Wow. We're not sure we've ever seen such a pink BIOS before. The clear CMOS jumper is situated underneath the graphics card, and potentially an IDE ribbon thanks to bad placement of the IDE connector as well, not to mention the FDD and two SATA ports in the complete wrong place. Add in lacklustre overclocking and we can only suggest you go elsewhere.

**ASUS Commando**

Price **\$399** Street Price **\$380** Supplier **ASUS**
 Website www.asus.com.tw
 Chipset **P965 + ICH8R** Max CPU voltage **1.85**
 Max DDR voltage **3.375**

We've been pretty hard on ASUS' Republic of Gamers boards, but this one is awesome. Priced reasonably competitively yet containing a heatpipe, power/reset/clear CMOS buttons and BIOS display perks, the Commando managed to deliver the highest FSB of the lot, making it the premiere choice for overclockers. Well done ASUS, your RoG branding finally has a contender.

**Conclusion**

Well there's a surprise. The P965 has proven it has what it takes in the face of the 680i and NVIDIA's huge noise they made about overclocking, especially the newer revision boards. While the 680i for the main part isn't far behind, unless you're after SLI, must run your DDR2 at 1T or some of the more esoteric nForce features like Ethernet teaming, then save yourself some serious cash and go the tried and tested Intel route instead.

The 650i is a curious entity that should probably be avoided due to its low performance flexibility and price in the face of the P965, and sadly the 975X is looking a bit long in the tooth these days, despite Intel's stellar efforts in pushing its ex-flagship model as high as it can.

On top of the pile are industry leaders Gigabyte and ASUS, proving that they know how to do it from experience and major kudos goes to them, especially in their P965 range for putting the overclockers first.

There are of course caveats to overclocking tests – different supporting

hardware (CPU, RAM etc), a different BIOS revision, even different motherboards of the same firmware and revision will have differing results due to manufacturing tolerances, so take the outcome above as a general guide only as to how far a board can go.

As a general rule when overclocking, make sure you use quality high speed RAM, a great CPU HSF (tower coolers such as the Thermalright Ultra 120 are ideal) and have a good high-powered PSU (Enermax, Seasonic, Hiper). Although the 680i boards allow you to unlink the RAM from the FSB and thus should technically allow you to get away with lesser quality RAM, it's always nice to reduce the number of possible failure points when pushing hardware beyond its limits.

Remember to make sure the case is well-ventilated, disable any board features you're not using in the BIOS (serial and parallel ports, IEEE1394, onboard sound), and get ready to clear the CMOS many times. Now get to it!

GEARBOX

All the best and
coolest gadgets
and gear!

▼ Noctua NC-U6

Price \$29.95 Supplier Nintek
Website www.nintek.com.au

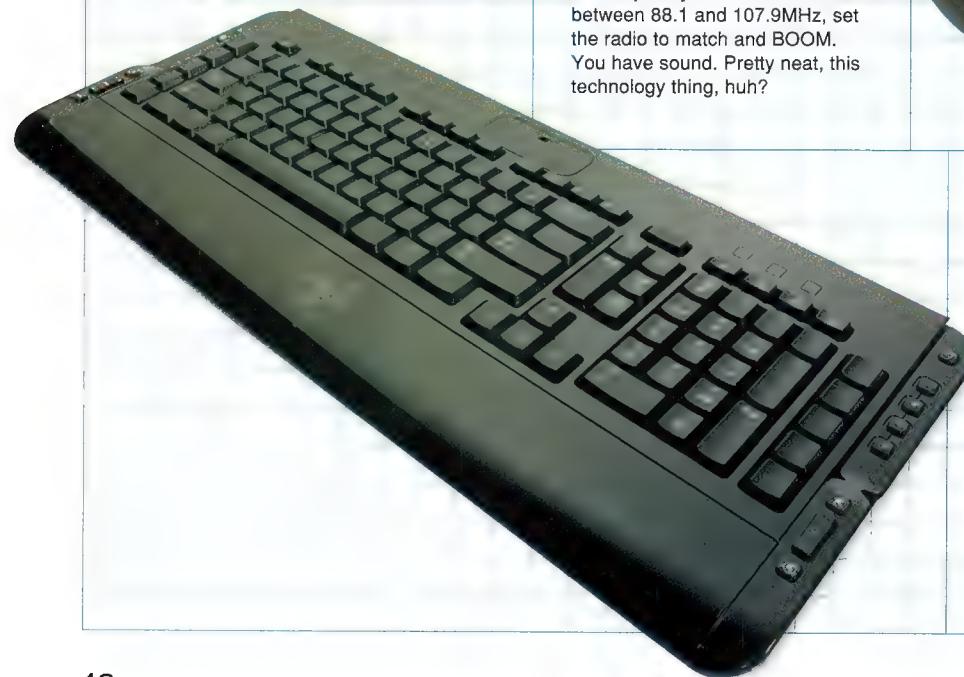
Noctua has a penchant for cooling, and luckily for all overclockers it has lent its expertise to the northbridge cooling market. Mimicking its bigger CPU tower brothers, the NC-U6 should ensure quiet and cool operation for you number one chipset – and heck, we're giving some away, so check out Hardcore now!



Belkin TuneCast 3 ▶

Price \$89.95 Supplier Belkin
Website www.belkin.com.au

We know what it's like – you own a car that's so old it couldn't even fantasise about having a CD player, let alone an audio input for your PMP. Fortunately even Fred Flintstone had a radio in his poor excuse for an automobile, so taking advantage of this Belkin has the TuneCast for the masses. Plug the 3.5mm jack into your portable media player, set the frequency of the TuneCast between 88.1 and 107.9MHz, set the radio to match and BOOM. You have sound. Pretty neat, this technology thing, huh?



Microsoft Intellimouse 3.0 ▶

Price \$69 Supplier Microsoft
Website www.microsoft.com.au

The Intellimouse 3.0 is back! The vastly popular gamer's mouse has been relaunched by Microsoft, upping the optical engine to 9000fps, but pretty much keeping the rest of the design as is, including the scroll detents that were removed in the 4.0. While it feels like a trusty friend, we have to say that laser mouses from Logitech and Razer especially have truly beaten the design many times over. Still, nostalgia is a funny thing...



◀ Razer Tarantula

Price \$170 Supplier Altech
Website www.altech.com.au

This uber huge battleship of a shiny black keyboard is definitely 'the business' when it comes to good quality shiznit. If you can stomach the absolutely colossal price for what is, let's face it, a keyboard. It glows; has special function keys that can be replaced with other keys that have various Counter-Strike-ish symbols on them; a built in 4x USB hub and headphone/microphone passthrough; volume control; media player controls and a price that could only be justified if it came with a mouse, was wireless and did all the housework for you. Still, it is pretty...

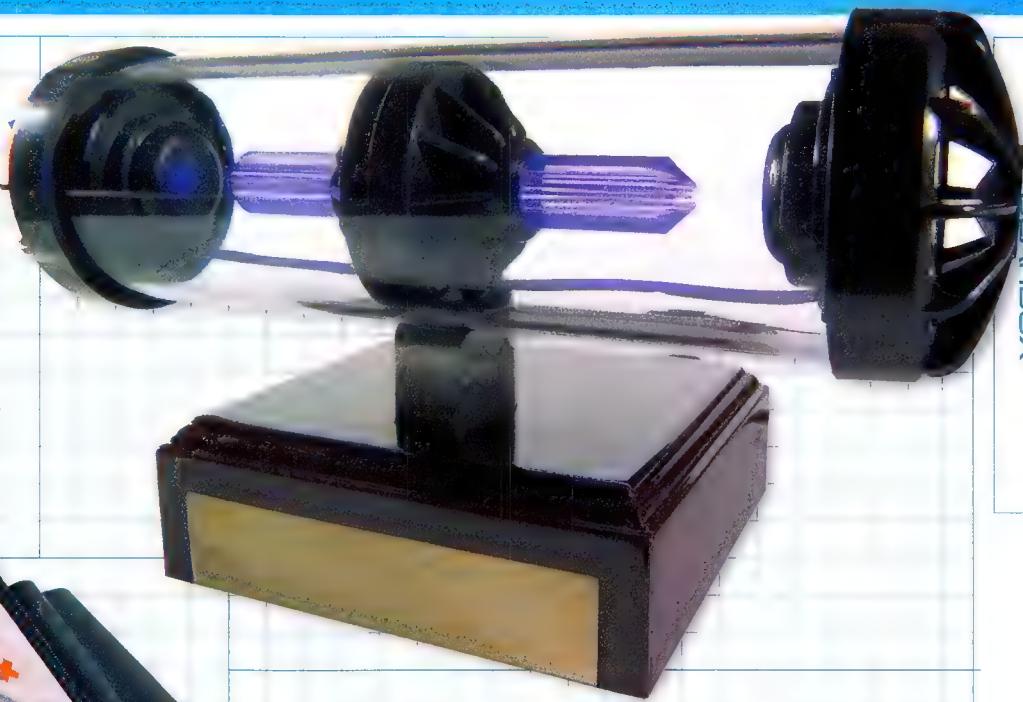
ROCK SPK-156 ► speakers

Price \$39.95

Supplier Anyware

Website www.anyware.com.au

Okay, so it's a tube with a pair of lights in it. But it also has a tweeter at either end of the tube, and a subwoofer at the bottom, and for the price it pumps out quite a decent sound indeed. Now if only they could streamline it, it'd be the perfect set of laptop speakers. In the meantime, you could always engrave your name on the front plaque.



Laser Z2 ►

Price \$69.95 Supplier Laser Website www.laserco.com.au

Laser is generally known for providing solutions to the budget end of the market, so imagine our surprise when this very decent Laser laser (yes, that's meant to be there twice) mouse turned up on our doorstep. The Laser Z2 comes with a rubberised grip, three hardware switchable speed modes (800, 1600 and 2200dpi) and a bloody nice scrollwheel. There's also a rapid fire button – click once for a red-lit scroll wheel and for one left mouse click to equal two, again for blue and a 3x multiplier, once more for purple and a 4x multiplier and then again to return to normal. Just don't leave it on in Windows. And for the left handers out there – sorry, this one's for righties only.



Belkin Easy Transfer Cable for Windows Vista ►

Price \$70 Supplier Belkin Website www.belkin.com.au

Now that's a long product name. Fortunately it's also accurate and is a pretty smooth ride – plug one end into your XP PC, the other into your Vista PC, install the supplied software and transfer all your documents and settings across from old to new, no silly backup methods required. After this it acts as a normal transfer cable, allowing you to copy whatever you want from PC to PC via USB 2.0, meaning that you'll never have to groan again if you run out of ethernet cables.



Cooler Master iTower 930

Craig Simms serves himself a server case.

SPECIFICATION

Price **\$TBD**
 Street Price **\$195**
 Supplier **Coolermaster**
 Website www.coolermaster.com.tw
 Specifications **ATX, front IO panel, lockable, hot swappable SATA bays, tool-less, steel construction.**

The iTower wants badly to be a server case for the home. For a start there's its incredible weight through being steel, and its lockable magnetically sealed front door. It has a brace splitting the middle of the case which features a height adjustable/positional card stabiliser and a positional air duct for the CPU – both of which can be removed from the brace, or the brace itself can be removed from the case entirely. It can even take a mini-redundant power supply if you're that way inclined. While one side of the case is removable (as well as padlockable and able to be held in place by a tool-less clasp), the other is securely pop riveted into place.

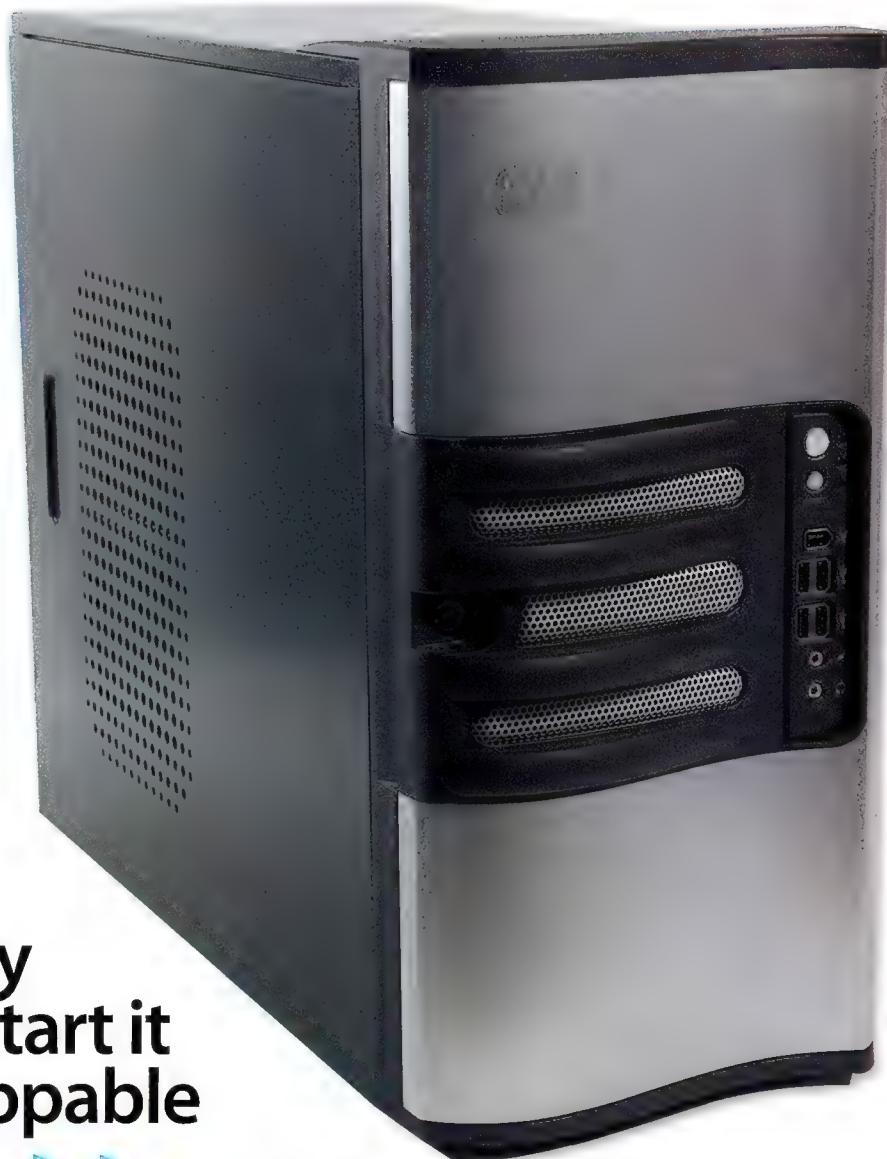
Then there's the desktop concessions – for a start, it's designed to look good, not just be purely functional and left in a rack somewhere. On the plus side, the front can be removed if you need the extra depth and don't care so much for the aesthetics.

It does a few nifty things – for a start it offers hotswappable trays for SATA drives (oooh).

Then there's the front IO panel – 4x USB, FireWire, headphone and microphone ports – although depending on your server setup front accessible ports could be an advantage.

Finally it's a desktop form factor – not the most rackable in the world, and better suited for someone's floor.

It does a few nifty things – for a start it offers hot-swappable trays for SATA drives (oooh), with its own circuit board to transfer power and data. This is achieved through pass-through SATA ports and four pin power connectors, but it does a few more duties as well, featuring four fan headers and access/



failure LEDs for each drive so you can make sure all is well with your storage behemoth.

A 90mm shrouded fan sits behind the circuitry, blowing the hot air generated by the drives into the case to eventually be vented by the 120mm fan at the back. This is a bit questionable though – the circuitry covers almost the entirety of the four 3.5" bays, stopping most air flow, greatly neutering its effectiveness. There is also no intake fan – this is all you get.

There are six 5.25" bays, one of which has been sacrificed by a 5.25" to 3.5" converter. Each of these feature an excellent quick

release mechanism, and Cooler Master has followed up with a pretty darn decent one for the back add in board slots as well.

Frankly we'd love a whole heap of weight to be removed and despite the coolness of the hotswap bays, we think most home users would be happier with the greater flexibility offered by something like the CM Stacker.

Still, if you need to do colo and for some reason can't do a rack, or just want to appear nerdy in front of your friends this is not a bad substitute.

CS

SCORE **8.0** OUT OF 10

Corsair TWIN2X2048-8888C4DF

Damien Virulhapan and Craig Simms go in search of RAM domination.

SPECIFICATION

Price \$1129 Street Price \$940
 Supplier Altech
 Website www.altech.com.au
 Specifications 2x 1024MB, 4-4-4-12, DDR2-1111 @ 2.4v; EPP supported, 3x 40mm fan included.

In the never-ending battle to get the fastest speeds and lowest timings, RAM manufacturers are being forced to create improved cooling methods. Plain old heatsinks were never intended to support the extreme speeds and voltages that overclockers always like to aim for.

Plus, designing new and crazy-looking 'sinks provides RAM manufacturers with a way to make their products sexy.

Cue the Corsair TWIN2X2048-8888C4DF 2GB DDR2-1111 RAM kit with included 3x 40mm Dominator Airflow fans and new improved heatsink. The RAM chips themselves are likely very highly screened Micron DDR-667 CL5 parts, most probably D9GMH BGA, although Corsair, like other RAM manufacturers, does have a tendency to use other chips of equivalent quality due to availability issues. Combining timings of 4-4-4-12-2T at 1111MHz with 2.4v DDR voltage, and setting you back over \$900, this RAM was made for enthusiasts.

On the 8888C4DF there are separate heatsinks



The included 3x 40mm Dominator Airflow fans use a three-pin header for power and can be used for any RAM as it clips onto the notches on the motherboard.

The fans do run quietly, however the specifications of the fans are unknown, which makes it hard to say how much airflow the fan actually provides. On top of this the sticks never

DH Deluxe, we found better luck on a Gigabyte GA-965P-DS4. After a ridiculous amount of fiddling we finally hit the rated speed at 2.4V DDR, +0.35V on the MCH and +0.25V on the FSB using a 2.66 ratio at an FSB of 418MHz. This netted us 7103MB/s and 7128MB/s in Sandra's Int and Float memory bandwidth tests respectively.

Despite our best efforts the sticks would not go above this speed and be Orthos stable, even with the incredibly lax timings of 6-6-6-15. Going for low latencies instead of high frequencies, at 800MHz we managed 3-3-3-10 quite happily, pulling 5724MB/s and 5728MB/s in Sandra.

We hit a number of board compatibility problems with these sticks, and even then they required a lot of tweaking to realise their potential. Whether the motherboards need a firmware update to handle them properly, or the sticks themselves are just cantankerous we can't tell.

Assuming you find a compatible match, your only problems are the pricing and availability. Both of these factors are tied to the extensive screening process that Corsair uses to select the right ICs so that these kits run at their rated speeds in Corsair's labs. After all, good things come to those who wait – and looking at how the DDR2 market has gone so far, the wait will be a long one.

“It's a sturdy box with the RAM like a prime sirloin steak, sandwiched in between two chunky pink layers of foam.”

that cool the BGA chips and the PCB. The PCB is cooled with a nickel-plated heatsink and the BGA chips kept chilly with a black anodised heatsink to improve heat dissipation. Corsair redesigned its PCB so that the nickel-plated heatsink could fit. As a result, the PCB itself ended up being 39mm tall – 9mm taller than the standard DDR2 PCB.

What we noticed first on receiving the RAM was the best packaging ever. Gone was the tacky plastic, replaced by a large sturdy box with the RAM like a prime sirloin steak, sandwiched between two chunky pink layers of foam.

really seemed to get that hot, especially compared to some of OCZ's alternatives – but at least it will make your RAM look fantastic. [Oh no he didn't. – Ed.]

With the new heatsink and fan, the RAM modules were only slightly warm. A more effective solution would be to install a 92mm or 120mm case fan over your RAM, although the Airflow fan is better than nothing.

While we sadly had little luck reaching the advertised timings when hooked into a 680i-based motherboard, or even a 975X-based ASUS P5W

SCORE **7.0** **OUT OF 10**

SPEC'S

Price \$115 Street Price \$93
 Supplier Altech
 Website www.altech.com.au
 Specifications Socket 775/754/
 939/940/AM2, 110mm fan,
 1250rpm silent; 2800rpm normal,
 764g with fan.

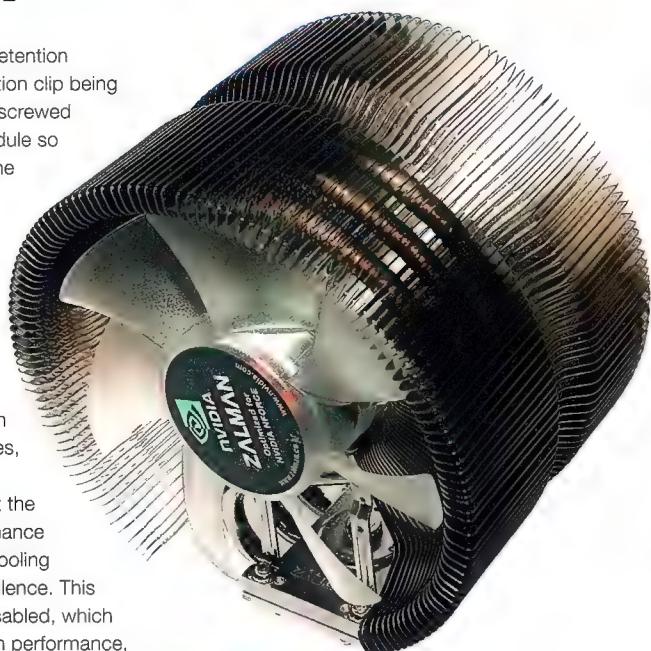
Zalman CNPS9700NT

installation of a back plate and a retention module is required, with the retention clip being passed through the heatsink and screwed on both sides of the retention module so that it the 9700NT is secured to the motherboard.

Lapping the base of the 9700NT is not required, as it too has been nickel-plated so that it's smooth and shiny and ready for action.

Strapping the 9700NT onto Chernobyl resulted in a temperature of 43 degrees with an ambient temperature of 27 degrees, with the fan producing 61dBA of noise point blank. This places it at the top of the pack in cooling performance but, as so often is the case, the cooling power comes at the expense of silence. This result was obtained with PWM disabled, which is the only way to go for maximum performance, and to pull a consistent reading.

The 9700NT offers flexibility at a price that can't be matched, whether you are after performance or silence. The little of bit bling and the bundled thermal paste sweetens the already great deal.



SCORE

8.0
OUT OF 10

Dell 3007WFP-HC

SPEC'S

Price \$2799 Street Price \$2799
 Supplier Dell
 Website www.dell.com.au
 Specifications 30"; 300cd/m; 1000:1
 contrast ratio; 2560x1600; 8ms
 G2G; 11ms B2W; 92% of NTSC
 colour gamut; 178° viewing angles.

Nothing has changed between Dell's last 30" and this one, except for the panel. It still has the lone DVI port – we would have thought the opportunity to add at least component or HDMI by now would have overwhelmed Dell, but apparently not. Even HP's new 30" the LP3065, which uses the same panel as the Dell, has managed three DVI inputs – like the Dell there's still no menu button or AV inputs, but it's something.

The panel in question is an LG LM3001WQ1, which thanks to the wonders of WCCFL (Wide Cold Cathode Fluorescent Lamp) can now display 92% of the NTSC colour gamut, which Dell claims is 20% more than most other monitors.

You can notice the difference – things just seem a little more vibrant, and colours a bit smoother in gradation – however part of this could be due to the increased contrast ratio, at 1000:1 rather than the previous model's 700:1. It is, however, noticeably not as bright.

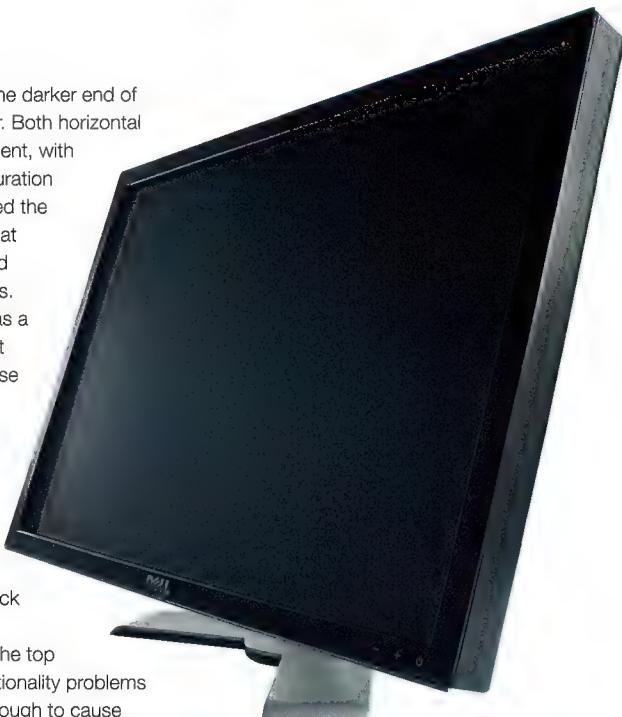
In the DisplayMate tests it performed pretty

well, being able to show a 4 on the darker end of the scale, and a 251 on the other. Both horizontal and vertical gradients were excellent, with none of the banding and discolouration problems popping up that plagued the 2407. We did notice, however, that purples and blues tended to band more obviously than other colours. Gaming and watching movies was a delight, as the impossible-to-beat immersiveness and quick response time took control of our senses.

Switching off the lights and setting the background to black, we found disappointingly noticeable light bleeding from all four corners – although once there was imagery on-screen it was impossible to pick this out.

The back of the monitor near the top also got worryingly hot – no functionality problems cropped up, but the heat was enough to cause some concern.

Overall, the new Dell is certainly better than the old one, but we would have hoped for a little more innovation and some of the concerns from the last one to be addressed – particularly the lack of OSD and limited video inputs.



SCORE

8.0
OUT OF 10

Sony DVDirect VRD-MC3

Craig Simms always knew his life would go straight to DVD.

SPECIFICATIONS

Price \$399 Street Price \$345
 Supplier Sony
 Website www.sonystyle.com.au
 Specifications Composite, S-Video, USB, FireWire inputs; card reader. DVD+R 16x CAV, DVD+R9 8x Zone CLV, DVD-R9 8x CLV, DVD+RW 8x CLV, DVD-RW 6x CLV, CD-R 48x, CD-RW 24x.

Yep, so it's a bit CE for Atomic. And it looks like it's got an iPod in the middle. But when Sony offers something of good value that is actually a bloody good device too, we tend to sit up and take notice.

The DVDirect is for all intents and purposes a DVD burner strapped to a custom board and chip that helps to create fully menu-driven DVDs from pretty much any composite, S-Video, USB or 4-pin FireWire source. It'll even create picture slideshows with a choice of three background music presets if you tell it to, courtesy of the inbuilt card reader that supports Memory Stick Duo/SD, Memory Card, xD and CF.

It's definitely not for high-end production as evidenced by the lack of component, but could be the perfect ease-of-use tool should you have a bunch of VHS, beta or old handycam footage lying around that you'd like to digitise with a minimum of fuss.

It really is as easy as setting up the source, inserting a DVD and pressing the big record button. You can even pause midway and switch



your source, meaning you can stitch a single DVD together from a number of tapes. During this entire process, footage is played back through the centre screen.

From the auto-DVD menu point of view, there are four presets you can select from in terms of background, and chapters can be created automatically at a time period you desire, from five to 15 minutes. Interestingly there doesn't seem to be an option to turn the DVD menu off altogether.

Video quality can be adjusted should you want to store more on the DVD than usual, and of course you can select between NTSC and PAL. To finish up, you just hit the stop button, and for compatibility finalise the disc through the setup options. Done!

So, a decent product, all done and dusted right? Nah.

Being *Atomic*, we ripped the case open, jacked in a standard IDE cable and checked out exactly what sort of drive the DVDirect was.

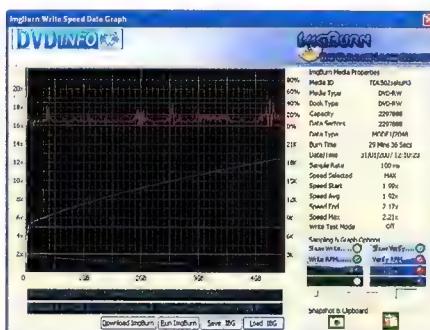
DVDInfoPro identified it as a Sony DW-Q120A, a re-badged Lite-On SHW-160P6S. We ran it through the ImgBurn discovery test to see how it treated some TDK 2x DVD-RW, media code TDK502sakuM3.

CPU utilisation on the verification was excessively high (on average about 10% and massively spiking to 40% at the end of the disc), meaning that there were read back problems. Fortunately the drive is used primarily to record, and in this regard the write speed kept a consistent 2x for the entire burn with no visible problems. Quality graphs from the PIPO scan were also unimpressive – so we thought

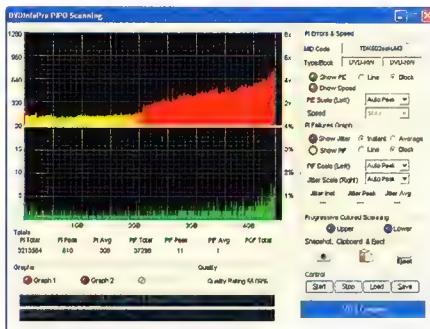
“We ripped the case open... [and] cross-flashed the firmware. It was really, really sweet.”

what the hel. With the help of tnFW club.cdfreaks.com/showthread.php?s=&threadid=83294 and rpc1.org we cross-flashed to firmware PS0B of the Lite-On model and tried again. This, inconceivably, while giving an ever so slightly better CPU utilisation read graph, gave a worse result for the write quality. This suggests there are potential issues with hardware/firmware here.

Still, this is all being a bit hardcore for the target market it's aimed at – the home user with a lot of old video that needs to be converted hassle free – and in this light it's certainly an excellent product, not to mention represents a bit of a boon to the home recording community considering its price point. Despite the average DVD burner contained within, we can give the DVDirect a cautious thumbs-up.



▲ Check out the verification CPU utilisation (red line). Far too high.



▲ This is not a happy disc.

SCORE **7.5** OUT OF 10

Compro Videomate T750

SPECs
 Price \$149 Street Price \$133
 Supplier Anyware
 Website www.anyware.com.au
 Specifications PCI slot; DVB-T input; analogue TV input; FM tuner; S-Video in; Composite out; remote control.

The Compro T750 Dual PCI DVB-T and analogue TV/FM tuner card (say that three times fast) packs quite a lot of connections on its PCB, featuring a DVB-T input, TV input, FM antenna, S-Video in and Composite in for all your TV viewing and recording needs. A remote is also included for those who like to sit at a distance.

One of the niftier features is the ability to power up your PC via remote. This requires you to re-route the Power SW cable to the T750 and another supplied cable from the T750 to the motherboard header.

What's even funkier is if you set it up correctly, this gives the T750 the ability to boot up your PC and start a scheduled recording, as well as shut down your PC once the recording has finished.

The bundled ComproDTV 3 software is minimalist in its design, with the main channel, volume and recording all on the main interface, while the rest of the options are sneakily hidden away for you to pop open. FM tuner software and DVD viewing software are also included.



If you don't like missing out on any of the action, ComproDTV 3 allows you to view five different channels at once, either as Picture In Picture or in a preview frame outside the main screen (called aptly enough Picture Out Picture). We're still trying to think of a situation when you would use this feature, but if you need it, it's there. Alternatively, for those under Microsoft's dominion the card is completely MCE2005 compatible.

Out of the box, the T750 supports video recording in MPEG2 and MPEG4 formats, and audio recording in MP3 and PCM formats, amongst a selection of other formats. However, once you install the appropriate codecs, the full potential of this TV tuner is unleashed as you are

able to record video in DivX and XviD, and audio in OGG and 3vix D4.

The T750 is a fully featured TV tuner that comes with everything you need for an affordable price. About the only weakness is the lack of future proofing by not making it a PCI-E part – but PCI isn't dead yet, so if the Videomate fits your needs, you know what to do.

 DV

SCORE **8.0** OUT OF 10

Razer DeathAdder Laser Mouse

SPECs
 Price \$105 Street Price \$TBD
 Supplier Altech
 Website www.altech.com.au
 Specifications Right-handed; 4-buttons; 1800dpi laser; 1000Hz polling rate.

Razer has finally upped the ante in the ever-competitive gaming mouse market with its new DeathAdder gaming rodent.

The DeathAdder features Razer's new 3rd Generation 1800dpi laser with 1000Hz polling rate. You also get the usual left and right mouse buttons and scroll wheel, as well as two thumb buttons, all of which are programmable. There are also Teflon feet on the underside of the mouse to help with those smooth moves.

Razer's self-titled '3rd Generation Infrared Sensor' basically provides two major benefits over the mouses of previous generations. With the new laser, the DeathAdder is able track at 60 inches per second, compared with the Logitech G5, which tracks at 45 inches per second. This basically means that you'll get greater compatibility across various surfaces.

And if you're one of those people that don't have enough room for one of those gigantic oversized mouse mats and use the 'lift and slide' technique to move the mouse, with the

new laser, you can lift the mouse as low as 2.1mm, depending on surface, and still be able to move the cursor.

Of note is the excellent ergonomic design that Razer has chosen that features a smooth rubbery palm rest and strategically placed thumb buttons. The left and right mouse buttons are also contoured so that your index and middle fingers fit comfortably on the buttons, ready to click like you've never clicked before.

Unlike their previous gaming mice, with lights all over place, Razer has taken a more subdued approach with the DeathAdder, with the only lights being on the blue scroll wheel and the trademark pulsating blue Razer logo.

As previously mentioned, the driver software allows button configuration, as well as five profiles that allow five different dpi/polling rate setups, with dpi options of 450, 900 and 1800 dpi and polling rate options of 125, 500 and 1000Hz. A button on the underside of the mouse allows you to change profiles on-the-fly, if you're



into that sort of thing.

Unfortunately for the lefties out there, you'll have to adapt or stick with Razer's ambidextrous models. For the rest of us, the Razer DeathAdder proves that there are more to great gaming mouses than just big dpi values.

 DV

SCORE **8.5** OUT OF 10

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Participants will have a chance to compete for a share in over \$400,000 US in cash and prizes

in the following games:

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Masaya Matsura
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Hiper Type R 730W

SPEC

Price \$239 Street Price \$239
 Supplier ArenaPC
 Website www.arenapc.com.au
 Specifications 4x 12V rails; P4/8 compatible; 2x PCI-E; 2x molex to PCI-E; 4x molex; 4x molex extenders; 4x SATA; 2x floppy.

Here in our hot little hands is the second revision of Hiper's super shiny power supply. The mirror finish has been retained, making it a huge attraction for fingerprints and reflecto-porn zealots alike. There are a few differences – for example it's longer, there's a 75mm fan at both ends instead of one, and the whopping huge fan on the bottom has been replaced with the modular connectors that used to be on the side – and it's this change that's makes it a stroke of genius, no matter which way you think about it. If the PSU sits on the bottom of your case, then the power cables go straight up; if at the top they hang down – no need to route everything that little bit further any more because the damn things are sticking out the side. Unfortunately, the main power connector is still there.

The modular system has been improved, too. The cables only needing to be pushed in with the key oriented in the correct direction, where it automatically click locks into place. To

remove, you just have to pull the securing click lock ring away from the power supply. Very cool.

It somehow manages to be just as quiet as its predecessor, which is to say quieter than the grave of a legless mouse with cut vocal cords in the middle of an anechoic chamber exposed to the vacuum of space. That's quiet, for those not into bizarre analogies.

Under idle the 12V, 5V and 3.3V rails managed 12.53, 5.03 and 3.34 respectively. Hit with a load of 3DMark06 SM3.0 at 1920x1200 8xAA 16xAF on a Gigabyte 965P-DS3P with an 8800GTX, X6800 and 2GB worth of Corsair PC2 8500, this shifted a tiny amount to 12.50, 5.03 and didn't even bother with the 3.3V, with it staying at 3.34.

Hiper has carried on the excellent impression made with its first power supply



effort, while refining even further. With one of these in your case pumping out the juice, you won't be disappointed.

CS

9.0
OUT OF 10

Cooler Master Real Power Pro 850W

SPEC

Price \$TBC Street Price \$283
 Supplier Cooler Master
 Website www.coolermaster.com.au
 Specifications 850W; P4/P8 compatible; 4x PCI-E; 8x SATA; 6x molex; 2x floppy.

We've been spoiled by modular power supplies. The huge mess of cables spouting forth from this supply and our subsequent amazement has clearly emphasised the fact. Of course, once you hit the realm beyond 800W, then you have to expect said attachments, including the crazy 8x SATA connectors. This thing is definitely best suited to a server rather than your typical desktop environment.

Mirror finishes are apparently in, as the Real Power Pro happily allowed us to power our PC while simultaneously spying on whatever PC Authority technical editor Nick Ross was doing behind us. If nothing else, this allowed us to dodge several spitballs and one attempt to Velcro a RAM stick to our heads. [But you need the extra memory Craig. – Ed]

The power supply managed to stay very quiet at idle courtesy of the huge 140mm fan sitting on top, with only a faint rattle to be heard. Sitting around a metre away it couldn't

be distinguished from general background noise at all, so kudos goes to Cooler Master for that. Unfortunately the power supply became noticeably audible under load as a buzz developed. Tolerable, but not within the leagues of Seasonic and Hiper. A clear oversight, however, is the lack of an independent power switch on the back of the supply, requiring you to go to the wall if you want to switch off in a hurry. That, or you could just yank the cord from the supply itself.

When plugged into a small defenceless bonsai kitten that was moulded to act as a Gigabyte 965P-DS3P with 8800GTX, X6800 and 2GB of Corsair PC2-8500, it returned 12.08, 5.01 and 3.37V on the 12V, 5V and 3.3V lines at idle, respectively. Under load it returned 12.07, 5.01 and 3.37V.

The Cooler Master Real Power Pro 850W is a good power supply for anyone's needs, with only a few minor faults. If you have a file server and need to power eight SATA drives, this could very well be the beast for you.



8.0
OUT OF 10

atomic



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SPECIFICATIONS

Price \$99 Street Price N/A
 Supplier ASUS
 Website www.asus.com.tw
 Specifications Socket 775/478/939/940/AM2; 610g; 2,200rpm; 92mm fan; 52.25cfm.

Silver, Silver Knight, paint your palette copper and silver... or at least cool our cores effectively. ASUS' latest HSF offering continues the tradition of including the fan *inside* the heatsink, while borrowing some heatpiping and fan-esque style design from Zalman. Of course the fan glows blue, as all high-end products are supposed to, naturally. If it doesn't glow, it won't work as effectively, you know.

To date ASUS has had mixed results with its coolers. The Silent Square Pro was excellent, weird interior fan and all, while the unreleased Chilly Vent and Chilly Vent Lux were unspectacular in the most spectacular way. With this in mind, we were curious to see which side of the fence the Silver Knight would sit on.

The retention bracket included is easy enough to set up and hook the cooler in to, and thankfully ASUS has chosen to eschew Intel's hopeless click lock mechanism in favour of screws and its own backplate.

Unfortunately, up against our damsel in distress Chernobyl (a modified heat generator set to pump out 80W worth of CPU cloned calorific concoction) the poor Silver Knight didn't do so well, producing a temperature of 52°C in an ambient temperature of 28°C – a hardly impressive 24°C difference. Doubting what we saw, we cleaned off the base of the Silver Knight and contact slug on Chernobyl with Arctic Silver cleaning fluid and reapplied the thermal paste... only to get the exact same result again.

While the Silver Knight certainly has the looks, it just doesn't have the power to compete against today's high-end coolers. Better to place your money on a tower cooler like the Thermalright Ultra 120, Scythe Infinity or Noctua NH-U12F.



SCORE

6.0
OUT OF 10



Gainward 8800GTS Golden Sample

SPECIFICATIONS

Price \$699 Street Price \$611
 Supplier Australia IT
 Website www.australiait.com.au
 Specifications 550MHz core; 800MHz memory; 90nm; 320-bit 640MB GDDR3; 96 stream processors.

Gainward's GTS is the first overclocked 8 series GeForce we've seen after NVIDIA lifted the embargo on its clock speeds. Until now if you wanted faster core and memory speeds, you'd have to do it yourself and risk your warranty. We haven't seen any GTxs in labs yet, but they're floating around in online stores as we speak.

Gainward hasn't done much here in the clock stakes – upping the core to 550MHz from the default 500MHz, and leaving the memory as is at 800MHz. Still, every little bit counts, and the 8800GTS is a more than respectable performer already, even if we wish the price would drop a little bit more. But don't expect that until we see an equivalent AMD part.

Putting the card through the usual hurdles with our EVGA 680i, X6800 and OCZ Flex XLC 9200 RAM, in 3DMark06 SM3.0 (4xAA, 8xAF) it returned 2790 at 1280x1024, 2227 at 1600x1200, and 1975 at 1920x1200. In the same respective resolutions in Half-Life 2 (highest

settings, 4xAA, 8xAF) it scored 176.46, 141.90 and 127.21fps and Quake 4 (highest settings, multi CPU, 4xAA, 8xAF) spat back 116.9, 92.7 and 76.5fps, showing that even at higher resolutions the 8800GTS can deliver playable frame rates.

The 8800GTS is still a fantastic card and Gainward's overclocked version extends it further by managing to keep a sane price and offer great value. The same caveat of not knowing DX10 performance exists due to there being no games yet, but for DX9 this thing is smoking hot.

SCORE

8.0
OUT OF 10

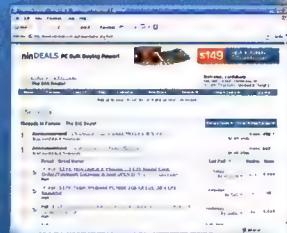


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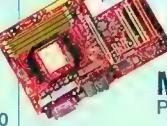
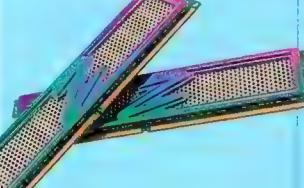
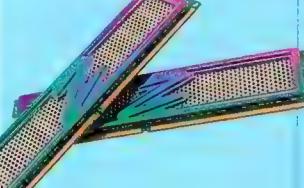
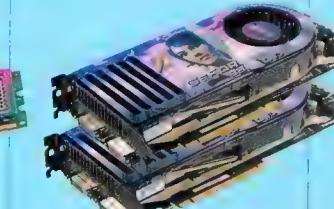
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There's nothing sexier than new kit. And whether you need to horde your pennies (Budget), want the most power for your dollar (Performance) or own a small mansion and

a collection of sports cars (Extreme), we're here to help with this handy matrix of *Atomic* recommended products. You may find your needs fall between categories – that's okay,

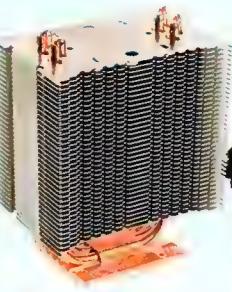
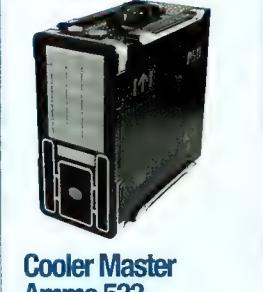
just mix and match to suit your budget! Each piece of kit has been reviewed hands-on in *Atomic*, so if you want to learn more, look up the issue and page number listed.

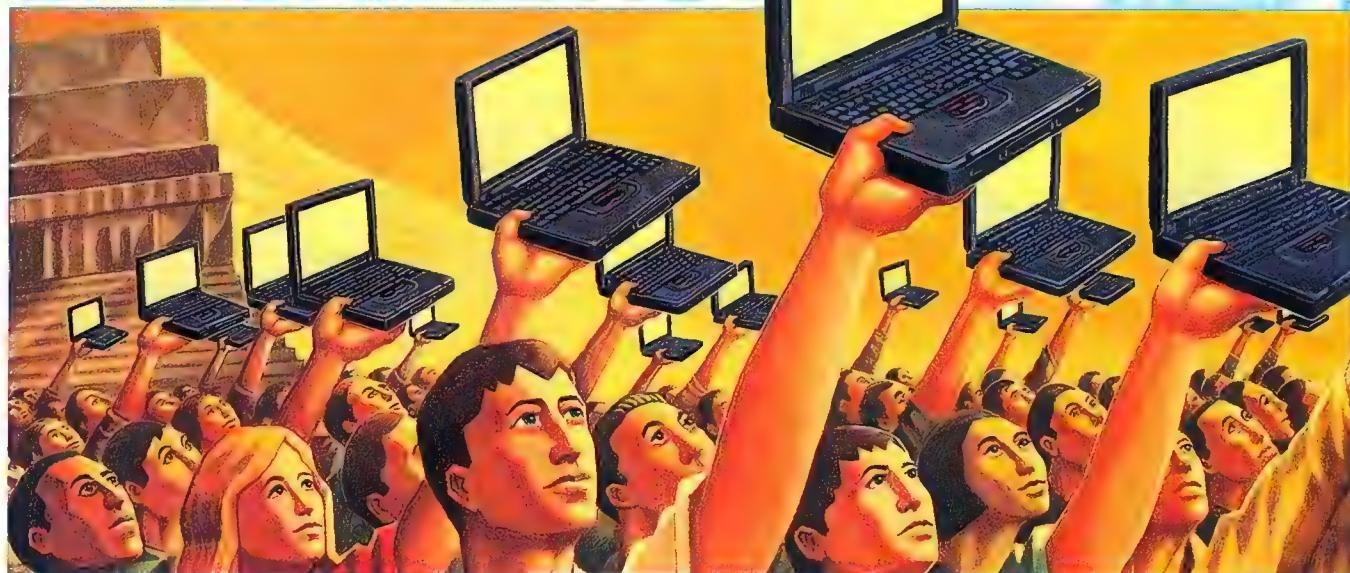
| | CPUs | Motherboard | Memory | Video card |
|---|---|--|--|---|
| BUDGET <i>I can't afford to eat... gimme gear!</i> | intel  Intel Core 2 Duo PRICE \$300-\$830 Stretch a little further and buy yourself a Core 2 Duo – you'll be thanking yourself later. The E6300 is the cheap ticket to speed, at \$300. <small>Reviewed in Issue 70 – Page 60</small> |  ASRock Conroe 945G-DVI PRICE \$113 ASRock's budget board may be using old technology, but it runs the new stuff just fine, and can even overclock a little. <small>Reviewed in Issue 68 – Page 33</small> |  Corsair Twin2X 1024MB 6400 Pro PRICE \$220 Corsair has a history of providing nice, stable and feisty sticks of random access memory joy. These RAM sticks are EPP compliant, have low latency and are nicely overclockable. 800MHz of RAM for everyone! <small>Reviewed in Issue 69 – Page 51</small> |  Powercolor X1950 Pro PRICE \$285 The X1950 Pro is nothing short of fantastic. Mind you, this could just as easily be the 7950GT, so watch this space in case the NVIDIA card drops in price. <small>Reviewed in Issue 71 – Page 47</small> |
| | AMD  AMD Athlon 64 AM2 X2 PRICE \$250-\$650 Cheap CPUs are a wonderful thing, and the X2s are now wonderfully cheap. The 3600+ is your budget baby at about \$230. |  MSI K9N Neo PRICE \$101 Excellent performance from a budget board, with plenty of legacy slots for upgraders. Don't expect to overclock though. <small>Reviewed in Issue 68 – Page 33</small> |  Corsair Twin2X 1024MB 6400 Pro PRICE \$220 Corsair has a history of providing nice, stable and feisty sticks of random access memory joy. These RAM sticks are EPP compliant, have low latency and are nicely overclockable. 800MHz of RAM for everyone! <small>Reviewed in Issue 69 – Page 51</small> |  Powercolor X1950 Pro PRICE \$285 The X1950 Pro is nothing short of fantastic. Mind you, this could just as easily be the 7950GT, so watch this space in case the NVIDIA card drops in price. <small>Reviewed in Issue 71 – Page 47</small> |
| PERFORMANCE <i>Hardware that bangs the best for buck.</i> | intel  Intel Core 2 Duo PRICE \$300-\$830 Core 2 Duo – crazily fast, crazily cool, crazily affordable, overclockable like buggery. The E6400 is the best buy, at about \$400. <small>Reviewed in Issue 74 – Page 42</small> |  Gigabyte GA-965P-DS3P PRICE \$226 The 965P-DS3P is a ridiculous overclocker that can't be ignored. Buy a low-end Core 2 and go nuts! <small>Reviewed in Issue 74 – Page 42</small> |  Corsair Twin2X 2048MB 6400 Pro PRICE \$372 Yes, these are the same sticks recommended for the Budget system. Sadly, they are also the only RAM sticks we've tested that are compatible with AM2 and Conroe. So until we get more in, the Corsairs will stay. |  GeForce 8800GTS PRICE \$570 DirectX 10 for the mainstream. It's a bit of a stretch financially, but will keep you happy for years to come. Fingers crossed for further price drops soon. <small>Reviewed in Issue 72 – Page 30</small> |
| | AMD  AMD Athlon 64 AM2 X2 PRICE \$250-\$650 The X2 series are still fantastic chips, and in the face of the Intel threat are now going for cheap. The 4600+ is your current sweet spot at about \$400. |  Gigabyte GA-M95SLI-S5 PRICE \$221 Gigabyte delivers yet another affordable, feature-filled wonder of the 21st century. <small>Reviewed in Issue 66 – Page 39</small> |  Corsair Twin2X 2048MB 6400 Pro PRICE \$372 Yes, these are the same sticks recommended for the Budget system. Sadly, they are also the only RAM sticks we've tested that are compatible with AM2 and Conroe. So until we get more in, the Corsairs will stay. |  GeForce 8800GTS PRICE \$570 DirectX 10 for the mainstream. It's a bit of a stretch financially, but will keep you happy for years to come. Fingers crossed for further price drops soon. <small>Reviewed in Issue 72 – Page 30</small> |
| EXTREME <i>Gimme power. Money is no object.</i> | intel  Intel Core 2 Quad QX6700 PRICE \$1440 It may be clocked slightly slower than the X6800, but it overclocks fine and has double the cores! <small>Reviewed in Issue 72 – Page 46</small> |  EVGA nForce 680i PRICE \$419 Stupidly over-featured and fast, if you've got the cash, then plonk it down here. <small>Reviewed in Issue 72 – Page 47</small> |  OCZ Titanium Alpha VX2 PRICE \$720 Oil slick coloured sticks are slick as their rainbow colours show. Make sure your mobo can hit the 2.3V required to power them! |  GeForce 8800GTX SLI PRICE \$850x2 The next generation is here, and it kicks arse. While we're still waiting for DX10 applications, for DX9 the thing utterly destroys the competition, providing you have a beastly CPU. <small>Reviewed in Issue 72 – Page 30</small> |
| | AMD  AMD Athlon 64 FX-62 PRICE \$1130 Sadly gets beaten by a mid range Core 2 Duo, but still the top of AMD's pile. <small>Reviewed in Issue 66 – Page 39</small> |  ASUS M2N32 SLI Deluxe PRICE \$295 Perfection in a motherboard. Beautifully laid out and overclockable to boot. <small>Reviewed in Issue 68 – Page 35</small> |  OCZ Titanium Alpha VX2 PRICE \$720 Oil slick coloured sticks are slick as their rainbow colours show. Make sure your mobo can hit the 2.3V required to power them! |  GeForce 8800GTX SLI PRICE \$850x2 The next generation is here, and it kicks arse. While we're still waiting for DX10 applications, for DX9 the thing utterly destroys the competition, providing you have a beastly CPU. <small>Reviewed in Issue 72 – Page 30</small> |

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|  Thermalright Ultra 120 PRICE \$75 Tower cooling that will keep your tower cool. Whack a Nexus 120mm fan on for near silent cooling. Reviewed in Issue 72 – Page 42 |  Seagate Barracuda 7200.10 320GB PRICE \$150 Seagate's fancy new technology makes this beast both fat and fast. We're almost at 1TB! Reviewed in Issue 69 – Page 40 |  Samsung 244T PRICE \$1485 Brilliance at 24", the 244T offers 6ms gaming, a wonderful gamut and more inputs than an alien hooker. Reviewed in Issue 69 – Page 48 |  AVLabs AVL325 PRICE \$210 While it can't hold a candle to the Z-5500D, with a price this low there's no excuse not to jump to 5.1. Reviewed in Issue 64 – Page 50 |  Cooler Master Stacker 830 PRICE \$290 Like the Stacker before it, this sensational Stacker stacks sumptuous specifications salaciously. Reviewed in Issue 61 – Page 36 |
|  Asetek Vapochill Lightspeed PRICE \$1160 Vapour phase change. Ooooh. Vapour. Phase. Change. No matter how many times you say it, it's still cool (pun!). Reviewed in Issue 64 – Page 38 |  Western Digital Raptor WD1500ADFD PRICE \$380x2 Dear lord. The performance king hath cometh, short of whacking in a SCSI. Buy two and RAID 'em. Reviewed in Issue 62 – Page 40 |  Dell 3007 WFP-HC PRICE \$2899 Thirty inches, 2560x1600, 11ms G2G. If you can handle the size and cost to run this massive beauty, you won't be disappointed. Reviewed in Issue 74 – Page 52 |  Logitech Z-5500D PRICE \$440 Able to play the 'liquid gold' that is DTS 96KHz/24-bit, this 5.1 beast can wreck both home and hearing alike with equal impunity. Reviewed in Issue 48 – Page 56 |  Lian-Li PC-S80 PRICE \$410 The PC-S80 must have been designed by an earmuff wearing design dude as it not only looks sleek and cools well, but it's super quiet to boot. Reviewed in Issue 66 – Page 41 |



Things that change, things that don't

'And the first one now will later be last, for the times they are a-changing,' sings Dan Rutter.

There's a piece of writing by one Richard Murnane called *The Power User's Guide To Power Users*. You can find it in umpteen places if you do a quick search. It is, in brief, about wankers and their computers. It's funny. Go and read it. I'll wait.

The sentiment of *The Power User's Guide* has remained perfectly valid since it was written no fewer than 15 years ago, but most of the statistics of the computers described therein are, of course, now ridiculously low.

The example of an outrageously overpowered computer bought by the pompous idiot of the title is, for instance, a '130MHz 80586 PS/4 with 100MB RAM and a five gigabyte optical drive'.

The actual state-of-the-art CPU at the time, when you could still spend \$10,000 on a high-spec business box, was the 50MHz 486DX. The DX2 wouldn't be along until 1992; it was the first ever CPU to use the 'clock doubling' technology that led to the modern age of slow-bus, fast-core x86 machines.

In 1991, though, Windows hadn't even hit v3.1 yet, and the amazing 386-punishing graphics of Wolfenstein 3D were a year away, too.

The reference to an 'optical drive' wasn't talking about CD or DVD-ROM, because CD writing in 1991 was still very exotic technology that a 'Power User' could not possibly figure out. Magneto-optical drives of different kinds were the best bulk storage option for the money-no-object set at the time; they had more capacity than the SyQuest and Iomega Bernoulli cartridge drives of the time, and they were tougher than the temperamental-yet-popular SyQuest hard-platter cartridges.

Gigabyte-class hard drives didn't quite exist yet. One-gigabyte SCSI drives made it to retail shelves in late 1991, but they cost about US\$1500 a pop.

These days, Dell will sell you a 2000MHz Sempron box with an 80GB hard drive and 512MB of RAM – but no monitor – for a lousy US\$359. And the worst thing about it is that its half-gigabyte of memory isn't really enough.

So that's... what... factor of 15, five and 16 differences between the CPU clock, RAM and disk specs of a laughably overpowered fantasy computer then, and a cheap and nasty box today.

The example of a monster monitor, though, is a '4096 x 4096, 12 billion colour hyper-VGA video display'.

We pretty much have the zillions of colours (12 billion colours would actually be something like 33.5 bits, but you couldn't tell the difference between that and the 24/3-bit colour that's normal today), but we ain't got 4096 by 4096. Display devices are one of those technologies, like batteries, that are not improving as quickly as almost everything else.

LCD screens are all very nice and flicker-free and skinny, but they haven't really boosted resolution a whole lot.

The current consumer-market god-monitors are the 30-inch 2560x1600 behemoths you used to only be able to get from Apple, then from Apple and Dell, and now under a few other brands – although the actual panels in those monitors are only made by a couple of companies at most.

Those screens have slightly less than a quarter of the pixel count of a 4096x4096 screen.

But they're already bumping up against the maximum bandwidth of dual link DVI. Dual DVI can go all the way up to 3840x2400, which is more than half of the pixel count of a 4096 by 4096 pixel screen. But it does so at only a 33Hz

refresh rate, which is adequate for movies but not for games. And that's where DVI stops.

HDMI may make it to higher maximum bandwidth in the future, but at the moment it's no better than dual DVI.

So I wouldn't touch the Power User's \$15,000-in-'91 PC with a barge pole today. Its stats aren't good enough for a Win2000 business box, let alone a general purpose desktop.

But I still want his monitor.

In '91 you'd have to pop a letter to Dan in the post. These days, feel free to use his 'electronic mail'. dan@atomicmpc.com.au

“ I wouldn't touch the Power User's \$15,000-in-'91 PC with a barge pole today, but I want his monitor. ”





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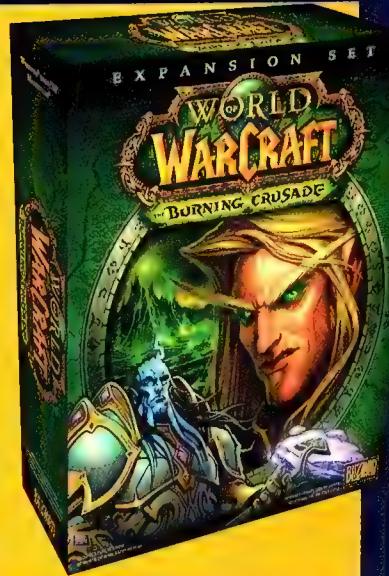
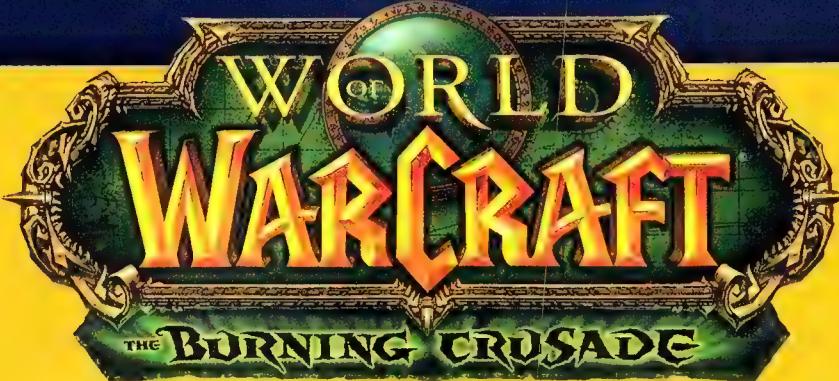
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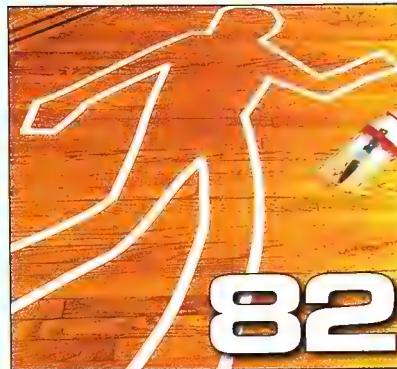
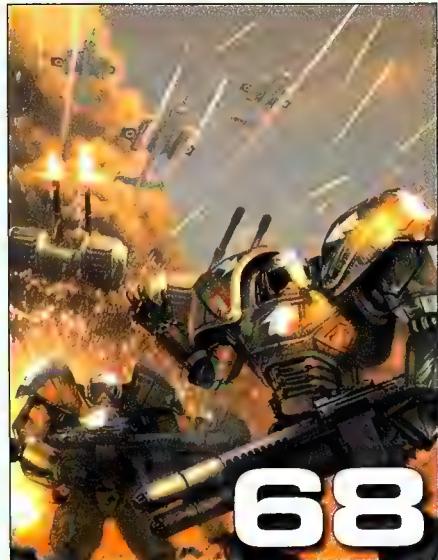
GAMEPLAY

GAMES, GAMING AND GAMERS COVERED ATOMIC-STYLE

Supreme Commander and The Burning Crusade, both in the same month? It must be heaven on Earth... or at least, a small portable heaven one can take from the sky to the ground and deploy for random moments of extreme euphoria.

It must also be real-time strategy month, because Electronic Arts gave us the opportunity to talk to the development team on Command & Conquer 3 and boy, all kinds of exciting came out of those guys.

All in all, it's an excellent time for PC gamers.



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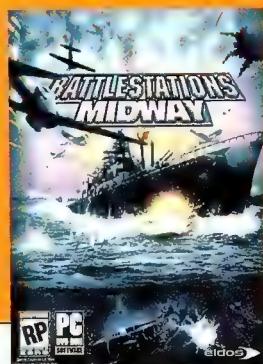
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opposing enemy unit it is strong against while being weak against another, it was one of the most effective tactics a player could employ in the early days of the genre. Eleven years later, gamers worldwide still use the tank rush to defeat newbies, or as a part of a grander strategy.

The tank rush however goes back further than Command & Conquer. Back in 1995 when the first C&C title was released – now referred to as 'Tiberium Dawn' to avoid confusion with other games in the series – it was easy to identify its heritage. For one, it was developed by Westwood Studios (now EA Los Angeles), that had previously created the RTS Dune II. And spice, the harvested resource in DII, was strikingly similar in behaviour to that of Tiberium. Although Dune featured three playable sides and C&C just the two, players could quickly see the righteous Atreides in the form of the Global Defense Initiative (GDI) and the evil Harkonnen represented by the Brotherhood of Nod. C&C was essentially a reskinned Dune, but the setting, characters, units and environments were completely different to those of Frank Herbert's fictional universe. C&C also did something that Dune did not – introduce the gaming community at large to real-time strategy.

A revisit to Westwood's world of C&C is long overdue, and EA Los Angeles, with C&C Generals and the Lord of the Rings in its bag of top-notch RTS titles, has set its sights on recreating C&C in a form that will hopefully again pioneer the genre it helped create.

Tiberium tactics

'We've always known we'd go back to the Tiberium universe,' says Mike Verdu, executive producer on C&C 3: Tiberium Wars. 'Many of us are quite passionate about the original franchise, and we couldn't wait to work on the next chapter.'

According to Verdu, the decision to develop C&C3 has been long in the making, the game marking the culmination of seven years of ideas brainstormed since the release of C&C 2: Tiberium Sun. Although quite a few of Westwood's original crew left the company once it was absorbed by EA, there's still a hearty contingent at the publisher's Los Angeles branch that includes Westwood's co-founder Louis Castle, so you can be sure that the feel and spirit of C&C will be present.

The year 2047 serves as the starting point for the new game. Verdu explains that Tiberium continues to destroy the Earth, as it was doing in C&C 2, 'embodying a terrible dilemma as it is both the ultimate energy resource and the worst ecological catastrophe in history.'

Divide and conquer

Logan Booker tank-rushed **Mike Verdu**, executive producer on **Command & Conquer 3**, to get him to spill the beans on the long-awaited title.

Above 'Yo! Tank rush the show.' GDI troops get to work.
Above right Looking for a parking spot in the Blue zone.
Below Ion cannons at the ready – Command & Conquer is back

While Blizzard's Starcraft may have made the gaming term 'zerg' ubiquitous today, Command & Conquer forged its original incarnation – the 'tank rush'. Both expressions refer to a real-time strategy tactic whereby the player overwhelms his opponent with sheer numbers, sacrificing versatility for power. Until the introduction of 'scissors/paper/rock' gameplay, where each unit has an



'Tiberium has polarised the world into two powerful warring factions: GDI, the alliance of advanced nations fighting to stop the spread of Tiberium and maintain order at any cost, and the Brotherhood of Nod, a hybrid religious movement, corporation and terrorist organisation that believes Tiberium is the catalyst for the next stage of human evolution.'

The tables have turned in the 17 or so years since the events in the previous game, with Nod now the popular and more powerful force in the new world. The GDI is nothing compared to its former self, and its battle to protect the planet from both Nod and the Tiberium threat is a losing one. If you're familiar with the series, then it should come as no surprise that Kane, C&C's bad guy, is making a comeback as leader of the nefarious Nod.

Weird science

When we heard C&C 3 was to be shown at E3 2006, we had no doubts that it would be good. But what really grabbed our attention at the E3 presentation was the effort that has gone into creating the design materials for the game. Not content with a perfunctory outline, EA LA has produced detailed documents and guidebooks for artists, programmers and designers, based on the C&C 3 universe. According to the presentation, when any team member has a question about the game, they're referred back to these resources.

EA LA went so far as to get a pair of professors to come up with the chemical composition of Tiberium.

'When everything in the game world feels like it is consistent and makes sense – from the science and mythology to the motivations of the major characters and civilisations, then I think you have something that is much greater than the sum of its parts,' explains Verdu. 'The game world starts to feel like a believable place, one that you can get lost in – a universe that assumes its own form of reality. Really good science fiction and fantasy stories, whether told on film, in book form or in games, create wonderful worlds that endure and that we can't wait to visit.'



Above And you thought Gridiron players wore big shoulder pads.

Speaking of Tiberium, the mysterious crystalline substance will take a central role in the new game. It has progressed from simple resource to essential game/story element from game to game, and now it will serve as the primary plot element. Verdu explains the entire scope of its involvement.

'In addition to playing a key role in the game fiction, Tiberium is the main game resource. All three factions [yes, three! But more on this later] in the game use Tiberium to drive their economies.'

Additionally, EA LA has introduced units into the game that directly interact with Tiberium in the field – further impetus to maintain control of crystal fields and introducing new strategies to players. Tiberium has also become such a problem that parts of the planet are now categorised into different zones, depending on their level of Tiberium infestation.

'Blue zones are relatively pristine and have minimal Tiberium contamination. Yellow zones have significant Tiberium concentrations that are relatively widespread – Tiberium is everywhere and it's dramatically affecting the environment. Red zones are uninhabitable hellscape where Tiberium infestation has reached critical levels,' says Verdu.

While the GDI occupies the Blue zones mainly, Nod has set up in the Yellow zones and recruits from the desperate population that believes the GDI has abandoned them.



'Be leery of games that claim to fully use multiple cores – the architectural challenge is significant.'

'The zones do have some effect on gameplay. You won't find many structures to garrison in a Red zone while Blue zones are filled with buildings that turn them into urban combat zones during multiplayer games. Tiberium is also distributed in different ways depending on the zone – you'll find tidy patches of Tiberium in Blue zones held back by GDI resonator technology while Tiberium grows unchecked in Red zones.'

Unity

At its core, C&C3 is an RTS, and that means funky units to throw into combat. According to Verdu, the game won't disappoint on this front.

'We have introduced interesting ways of combining units, some unique new units and structures that work with our build system and sidebar interface to open up early game strategy. We have introduced a new "information warfare" dynamic that allows you to spoof your enemy's radar, confuse their sensors, and even alter what they are seeing on the screen,' he says.

'Units have an amazing range of capabilities, powers,

weapons and upgrades. Some units turn into structures when they're deployed. Other cool unit abilities include mine laying, the ability to tag enemies with sensor pods so you can track them, jump jets, mortars, stealth technology [and more]. Also, our third faction plays like no other RTS faction out there... this is where we've taken some risks.'

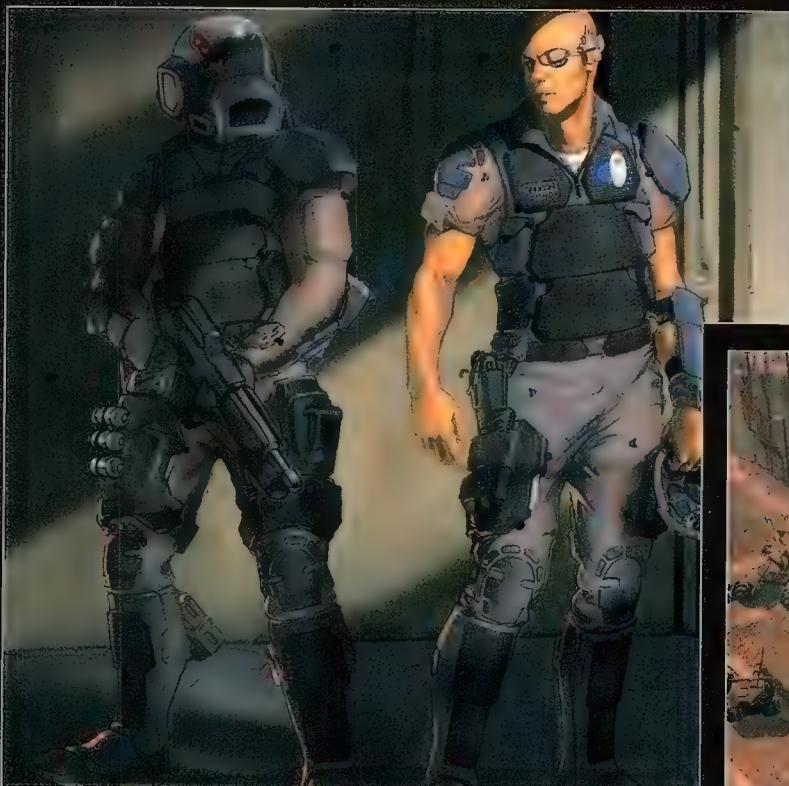
We weren't able to find out a great deal about this third faction, except that they're an alien race rumoured to have brought the Tiberium plague down onto Earth. Is it an attempt to terraform the planet for colonisation, or a gift from the heavens as Nod wants the world to believe? Whatever the case, the third race will be playable in the game. And Verdu is right – introducing a third side into what has traditionally been a two-faction fight is a risk. Whether players will embrace the addition is something only time will tell.

If you're concerned that the third side will detract from the GDI and Nod, you have nothing to fear. Verdu says that along with new and exciting units, some familiar troops will return.

'We're bringing back a lot of the Tiberium universe favourites such as the Mammoth Tank, Orca and Stealth Tank, but we're also including several new and unique units for both GDI and Nod. The balance of "new" to "classic" is probably about 50/50 or 60/40 for GDI and Nod. The third faction is of course all-new and has some of the most innovative units I've ever had the pleasure of working on in an RTS.'

Specifically, the Nod will receive a new unit – a giant battle mech armed with a laser cannon known as the 'Avatar', which Verdu says will act as the side's Mammoth Tank. Additionally, the Avatar can be customised by 'ripping' bits off other units – if you want a nice flamethrower on your mech, just grab it off a Flame Tank. Need stealth? Borrow the generator from a

Below Modelling the latest fashions for C&C 3.
Below right Getting into urban redevelopment 2047-style.





nearby Stealth tanks. 'Put those components together and you have a 40-foot-tall, multi-legged, flame-spewing, laser-zapping, particle-beam-ting war robot of doom,' explains Verdu. 'July the stuff to put the tremble in your underpants... but what about the GDI?'

'A typical new GDI unit is a fast attack jet called the Firehawk that can be equipped with air-to-air or air-to-ground missiles, and it has a sexy rocket booster upgrade that allows it to arc high into the stratosphere to avoid anti-aircraft fire of any kind, dropping down over enemy targets to deliver a nasty surprise,' says Verdu.

'GDI is also fielding a new main battle tank called the Predator, a fast scout buggy armed with rockets called the Pitbull, heavy infantry in powered armour with jumpjets (Zone Troopers), an APC that can carry all manner of troops, and a unique vehicle called the "Rig" that can deploy into a forward battle base – among other new units as well!'

Kane TV

If C&C is infamous for anything, it is its full motion video. It has copped plenty of flak over the acting quality of its pre-mission cutscenes. EA LA has set out to abolish this reputation and has literally spared no expense to make the FMV exceptional.

'We knew from the start that we needed a very talented cast to do justice to the story for C&C 3,' says Verdu. 'I believe we've created a story for this game that has real depth and resonance, featuring interesting and complex characters that grow and change over time, a rich world, and some truly cool moments. We needed actors who can bring our characters and our story to life – and we found them.'

They certainly did. The cast for C&C 3 is an impressive sampling of old and new premium sci-fi, including Michael Ironside; Billy Dee Williams (or Lando Calrissian as you'll probably know him); Tricia Helfer and Grace Park of *Battlestar Galactica* fame, who play Six and Boomer respectively and Josh Holloway, the roguish conman from *Lost*. It is, by far, the best collection of actors ever assembled for a game.

'EA's commitment to C&C shines through in the company's support for a top flight cast, a live action shoot on multiple stages with large physical sets, and several minutes of high-end computer graphics. C&C is back in a big way,' says Verdu.

Salvaging Sage

Behind the scenes, the venerable SAGE Engine from C&C Generals takes care of rendering the world of the third instalment in the Tiberium series. SAGE has been upgraded a number of times, the last iteration providing for EA LA's



Lord of the Rings: The Battle for Middle Earth II. For C&C 3, the capabilities have once again been improved to compete with the increasing expectations of gamers. According to Verdu, these additions include a 'next-gen' particle system to power explosions, smoke, haze and weather effects, as well as a post-processing system to add special effects to completed scenes.

'You can see heat shimmer and distortion in the atmosphere from weapon effects and engine exhausts [a Pixel Shader 3.0 effect]. Units and structures are normal-mapped and have specular highlights. These are just a few of the improvements that make the game look great.'

Verdu also explains that work has been done on the memory handling and data storage elements of the engine that should provide a dramatic performance increase over previous games. 'You'll see the results in super fast load times, crisp controls, and an absence of hitching or lagging from loading assets on demand.' The engine has also been optimised for dual and multi-core systems, and although not providing

Above Tiberium is held back by GDI resonator technology in the Blue zones.
Below A favourite returns in C&C 3: the Mammoth Tank.





Above The Global Defense Initiative prepare to kick Nod. Below There are enough physics to make C&C 3's world come to life.

as massive performance boosts as seen in Supreme Commander, will be faster than single-core.

'There is a natural performance boost when running on multiple cores – about 10 percent to 15 percent. But we don't have a true multi-threaded architecture. Again, be leery of games that claim to fully use multiple cores – the architectural challenge is significant and we're only now on the verge of realising the potential of multi-core systems.'

With Microsoft Vista recently released to general consumers and quantities of DirectX 10 parts, such as NVIDIA's G80-based products, making their way into the market, we asked Verdu why EA LA decided to go with DirectX 9 for C&C 3.

'We're right on the cusp of DirectX 10 with C&C 3 and we didn't feel we could just "patch in" a DX10 solution so we could boast that we had a DX10 game. True DX10 products are few and far between. Look to the next generation of our RTS games for true DX10 goodness. All that being said, you'll find that C&C looks amazing.'

He also says that when DX10 does finally hit, EA LA will more than likely continue to build on SAGE, rather than produce something from scratch.

Our last question about SAGE regarded PhysX and other physics solutions accelerated via hardware. Verdu says that adding physics is out of the engine, but the demand for

complete simulation was unnecessary, and certainly didn't warrant support from hardware.

'We have enough physics in the game to make the world come to life – but we certainly don't claim to have a realistic physics simulation,' explains Verdu. 'Physics simulation can be a tremendous drain on CPU and we are choosing to use that budget elsewhere – to make the AI great, to support improved pathfinding, to increase the number of objects in the world. I think it would be very cool to support hardware-based physics simulation and I look forward to the time when the installed base is such that we can count on that as a capability.'

Final orders

Any RTS worth its strategy tag has multiplayer, and C&C3 caters for this demand. Verdu was happy to mention a few of the features the team has implemented.

'Integrated clan support allows you to practise together, learn from each other, and then compete cooperatively with your friends. Your online profile will be jam-packed with interesting statistics that you can use to help hone your game, while our ladders and leaderboards will provide an objective measure of your standing within the community. Finally, but perhaps best of all, Match Broadcast allows players to demonstrate their dominance to large audiences by "television" their matches to other C&C3 players and to anyone who can download a freely available Spectator client. You could have literally hundreds – if not thousands – of people watch you play.' This last feature should help with the professional gaming crowd where it's not unusual to televise matches.

As for the single player campaign, players can expect over 35 missions to charge through, though Verdu did not say if this is for each faction or combined.

Verdu strongly believes that the combination of the multiplayer features, the history of the C&C franchise, the new units, the engrossing plot, quality FMV and the fast and fluid gameplay that C&C is renowned for, will push it ahead of the rest. 'With the legacy of C&C we always had the challenge of creating a game that felt fresh but familiar, a state-of-the-art 2007 RTS that also felt "right" to people who have an emotional connection to the games that came before,' explains Verdu.

'My proudest moment on the project is when we brought in gamers to play some multiplayer and heard those magic words: "This feels like C&C! C&C is back!"'



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what should have been the spark that set off a revolution in real time strategy games turned out to be an anomaly instead – TA hasn't been matched in scope in the past nine years, with only Taylor's Supreme Commander now a contender.

SupCom's core gameplay has had work done on it since Total Annihilation, with freeform base building, tech trees, and armies consisting of land, sea and air units. TA's plus-minus economics model is back, where resources simply flow into your base's grid, ready to be diverted into powering (in the case of power generators) or building (which is based of extracted mass from key resources).

Resource management is inextricably linked to every part of the game, where a poorly thought-out resource strategy will grind your entire war engine to a halt. For example, building too many units will put your mass extraction into the negative, meaning that the point defense towers you desperately need to get up and running will take another four minutes to build. No problem, you'll just build some mass extractors, but that, of course, drains a lot of power – and if you run out of power, how are you going to keep those shields up? These noodle-scratching compromises are pervasive throughout the game, so you better make sure you have a sound resource strategy.

The units themselves are fewer in number, but more carefully crafted than TA. The land, sea and air balance is superb, meaning you can't just pump out one type of unit and have them roll over the enemy. In fact, the army building element is intricate in itself. You'll need to make sure you have the right mix of arty, shields, flak and power

Supreme Commander

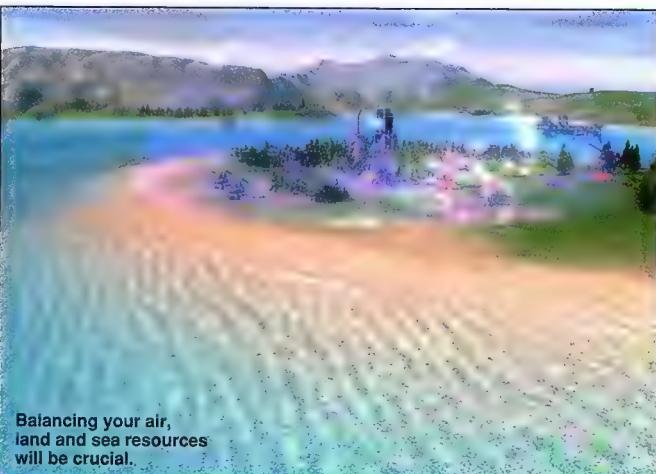
David Kidd plays Chris Taylor's Total Annihilation follow-up... that one with the robots.

Real time strategy games are in a rut. Worthy or not, Relic's distinct flavour of RTS games continues to dominate, with the recent Company of Heroes being a prime example of how the genre has become edgier, fast-paced, and tactical rather than about high strategy and intricate resource management. It's not a case of being inundated with fewer games, or even poorer games, but there's an obvious boilerplate that's pumping out the same derivative titles.

Fortunately, Gas Powered Games is fighting

the good fight by wrapping up its new traditional grand scale RTS in an interface that's so obvious it's hard to imagine anything else.

It's fitting that GPG's Chris Taylor should be the one that kicks the genre in the pants, given the universal appreciation for his previous opus, Total Annihilation. It was a monster of a game, with masses of units, a new take on resource management, pioneering line of sight, and tweakable AI. Yet evidently mainstream RTS developers are a little slow on the uptake, as





depending on what you're up against. And like the resource model, you'll need to carefully craft a military strategy as you won't have the resources to create all-powerful high-tech armies. Instead you'll need to decide how you want your military campaign conducted, and invest appropriately in air, land or sea, or a combination.

With such an emphasis on careful strategic planning you need a clever interface to help put your strategies in action – it's here that SupCom shines. You've seen the action shots and gameplay videos of the zooming option, but playing it is a revelation.

It's elegantly simple – the scroll wheel zooms in and out depending on where the mouse is pointing – and when you really hit the clouds the map abstracts your units into military symbols. There's also a heavy use of map overlays that can highlight economic yields, firepower ranges or waypoints. Holding Shift will show every active waypoint and ETA, letting you see in a glance where your units are going, what projects are lined up, and how long it all takes.

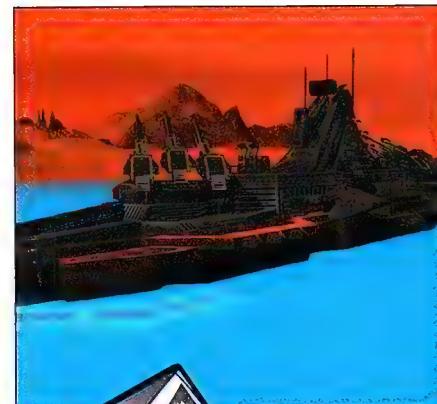
With the end game being filled with hundreds of units per side, you could be faced with a potential micro-management nightmare, but SupCom delivers the goods. If you want to coordinate an attack with two armies, grab your first one, send it to attack, then grab the others and double right-click on the same attack waypoint – the armies will automatically coordinate their attack to arrive at the same time. Other touches like transport

units automatically ferrying armies to and from a location, also make management easier without making you feel like you've lost control.

After such glowing praise, it's an absolute disappointment to get lumped with an unexpected hardware tax. The early game kicks along smoothly, lulling you into thinking you're going to be zipping around, watching your upcoming gargantuan armies gracefully roll over the map, and basking in a way that only a true interstellar military commander can. But when you hit around 200 units you'll see the ugly side of the game as it jerks, grinds, and eventually crawls so bad you'll find yourself glad when the game speeds up after half your units are wiped out. We even found ourselves altering our strategy so we could knock over the game early, rather than have it creep along towards the end. This is definitely a quad-core game – consider a chip dual-core as the absolute minimum, and if you go that route, be prepared for tears.

The hardware strain aside, SupCom still reigns. No particular element is outstanding in its own right. The graphics aren't amazing, the units are standard RTS fare, and the gameplay is almost too similar to TA. But how they fit together is a work of genius. And in the end, it makes every other RTS feel shallow and restrictive, which is as much an indictment on current RTS games as an acknowledgement of SupCom's greatness.

Get it now, but make sure you pick up a quad-core CPU on the way home.



PC
Developer Gas Powered Games
Publisher THQ
Website supremecommander.com

Recommended 2GHz dual-core CPU; 1GB RAM; 128MB DirectX 9 graphics card.

SPRINGING TO LIFE

If you squint, these screenshots could have come from Supreme Commander, but they're actually from 1997's Total Annihilation. The shots here are from the Spring engine, which has reworked TA into a true 3D engine. Spring takes official data from TA, or other mods, giving you a 3D camera, deformable terrain, and other modern interface features. Now that SupCom's here, it's hard to imagine anyone wanting to fire up a 3D version of TA, but you can check out the full release (for Windows and Linux), as well as other mods, here: spring.clan-sy.com



VERDICT

Sensible interface, utter supremeness.

Needs a quad-core CPU, grand scale may put some people off.



SCORE
8.0 OUT OF 10



be playing an alt character, climbing the level ladder to 60 for the God-only-knows time.

This all however will change with the release of The Burning Crusade (TBC), Blizzard's first pay-for expansion to the original game. Now, they get to do it in the Outland instead.

TBC is a sizeable update to World of Warcraft, and if you're still playing you'd be crazy (or you'll go crazy, one of the two) if you don't buy it. The most important change is the increase in the player level cap to 70, forcing level 60 players to dust off their questing caps and once again kill boars in multiples of five for experience and loot.

Speaking of loot, item budgets in the expansion have been extensively revamped. Within the first few days of questing in the Outland, most players will have gear on-par or exceeding that which was only available to raid fiends. Stamina in particular appears to have depreciated in value, and almost all Outland items have copious amounts of it. The reason behind this is obvious: To increase the length of fights in both PvE and PvP. So no more dying from 'three-minute' Mages.

Gear, which one could argue drives the game, is also now more encouraging of 'off-specs' for hybrid classes, which are usually pigeon-holed into healing – something that wasn't aided by all the healing-oriented epic sets in the original game. Leather, mail and plate gear with stats that promote spell and attack damage are now plentiful, so feral Druids, retribution Paladins and elemental Shamans have much to look forward to. Sadly, due to the rarity of healers, the default raid roster will more than likely demand that hybrids

World of Warcraft: The Burning Crusade

Logan Booker wants to know what happens when a paladin, a druid and a shaman walk into an instance. Other than heal.

Three years ago, no one was playing World of Warcraft, except perhaps the developers themselves. Even so, the signs of its powerful draw were undoubtedly there. Today, if Blizzard is to be believed, eight million souls are right now beavering away at their mice and keyboards, entranced by the MMO orgy that's transpiring on their screens. About a million and a half reside in Europe, another two and a half in the US, and Australia and Asia making up the rest.

Some are fighting skeletons hoping that – despite the game's maddening randomisation code – the particular one they're fighting will drop the bone fragments they need for a rep turn-in. Considering that's all skeletons are made of, it's not an insane expectation.

Others are running a dungeon for the 102nd time, praying that the tiger boss at the end will finally drop his Staff of Hale Magefire, despite his lack of opposable thumbs, or even the need for such an item. Finally, the majority will



be healers.

Standard 'green' items now also pack special modifiers (such as spell damage and feral attack power) that were normally reserved for high-level rares and epics.

Two new races debut in TBC – the Blood Elves and the Draenei, for Horde and Alliance respectively. Blizzard has taken a lot of feedback from players regarding racials, and both races have perhaps the best in the game – a mana drain and silence for Blood Elves, and a heal over time for Draenei. Blood Elves can also train to be Paladins and Draenei as Shaman, allowing access to classes that were once only available to a single side.

The expansion introduces seven new zones and new dungeons, all with multiple tiers to increase their longevity and consumption. On top of this, all new dungeons have a 'heroic' mode, accessible with a key purchased from the appropriate faction vendor, effectively doubling the life of each instance. Heroic mode increases both the difficulty of obtaining and the quality of the gear that drops within the instance. As for the new zones, they're exceedingly gorgeous. Of mention are Zangermash with its dank and mushroom-filled, but surprising surreal feel; and Terokkar, a luscious forest where the light breaks through the canopy in bright, green-tinted shafts.

All trade skills have had their maximum level increased to 375 and have a variety of new recipes available. The strength of the items available through trade skills should be equal to that available via raiding. For those looking for a new trade skill to learn, TBC includes 'Jewelcrafting', which allows players to craft circlets, rings and neck pieces, as well as cut gems for the array of 'socketed' level 60 to 70 gear.

Also part of the Burning Crusade is a revamped honour system. Introduced just before the expansion went live, the new honour

system allows players to accrue honour at their own pace and use it as currency to buy PvP items. A new Arena system accessible at level 70 also allows players to earn powerful gear and promotes 2v2, 3v3 and 5v5 battles.

While Blizzard has done an impressive job with the expansion – the amount of content cannot be faulted – there are a few problems that need to be addressed. Some areas, such as Terokkar Forest, lack quest polish and there's more than a few that cannot be completed due to bugs. While Hellfire Peninsula is packed with impressive new gear, the gear is so good that many characters progressing through the zone will find themselves looking identical to their fellows. A lack of an Auction House in the Outland also means frequent travelling back to Azeroth.

The game continues to suffer from two design problems – insane reputation grinds and the gear-oriented end game. In order to access the most powerful items and trade skill recipes in the game – which, for level 70 players will be the only thing left to do – players are forced to repeat the one 'turn-in' quest hundreds, and sometimes thousands of times to earn 'reputation' with in-game factions. For those with no life, this isn't so bad, but these grinds make these items off-limits to the busy and sane. A better system would be to have a universal turn-in as an uncommon drop off monsters the world over, usable to make purchases with any faction. This would allow players to pursue whatever quests or 'grinds' they wish to get their items instead of being forced to stay in the same zone killing the same monsters *ad nauseum*.

Despite these issues, World of Warcraft: The Burning Crusade is a mandatory purchase for any WoW player. It opens up far too much for new and old players to go unbought. Hopefully the next expansion will address the problems we've mentioned here.



PC
Developer Blizzard
Publisher Vivendi Games
Website www.worldofwarcraft.com
Recommended 1.5GHz CPU; 1GB
RAM; 128MB DirectX 9 compliant
video card; Internet connection;
original game.



VERDICT
New PvP system and Arena battles; additional talents and spells; two new races; increased level cap.

Maddening reputation/quest grinds; problematic hybrids.

SCORE
8.5 OUT OF 10





The Legend of Zelda: Twilight Princess

David Field tries to put the Triforce back together. Again.

You already know the story before you play *Zelda: The Twilight Princess*, because the series is a dependable diamond. Link, the eternal hero of Hyrule, is on a quest to save his village, rescue a princess, and banish a rising evil. But there are too few games with such a refined, warm and absorbing story to lose yourself in.

This *Zelda* outing sees you morphing between Link's human form and a wolf as you journey through Hyrule, which is falling into the

darkness of the Twilight Realm and on the edge of destruction at the hands of Gannon and his dark legion of monsters. Although many of the monsters have already been seen in previous *Zelda* games, the experience is darker and more mature.

You can see this in the dungeons, where the puzzle-solving elements of the game really shine. *Zelda*'s strength has always been about mastering minor gameplay variations, and through each well-paced dungeon the stylistic changes keep you in awe as you hunt for switches and targets to reach the dungeon's boss. Unfortunately, next to the

time and effort you can put into the dungeons, some of the bosses feel insultingly easy. *Zelda: Twilight Princess* is about the journey, not the destination – a journey with about 50 hours of stunning gameplay controlled with the Wii-remote.

Next to some of the other control systems we have played, the Wii-remote feels as though it was made for *Zelda*. You don't get as tired as you normally would when your hands are tied to a traditional gamepad. Sword manoeuvres become fluid and second nature within minutes. And although you don't need to play the game like a crazed, caffeine-fuelled monkey, things are a lot more natural and free-flowing when you do.

You'll find yourself flailing your arms around wildly during combat, but when you're moving through the game world it's a more placid





affair, with the analogue stick on the nunchuck controlling your movements, and items assignable to the B-button trigger by reaching your thumb up to the D-pad. You only need to point at the screen when you use items that require aiming, like the bow, clawshot and slingshot. The rest of the time, the wonderful Z targeting system introduced in Ocarina of Time and swings of the controllers take over.

There are some spine-tingling moments in the story, many of which come from Nimda, Link's partner in crime for this instalment. She is developed so well as a character that we'll feel cheated if she doesn't end up in a future Super

Smash Brothers game – which is more than we can say for Navi from Ocarina of Time.

It's stunning from start to finish and easily the Wii's strongest launch title, if not a contender for any top 10 games of the year list. The top-notch storytelling, stunning gameplay, jaw dropping environments and unhealthy doses of fun completely overshadow its few shortcomings. While you're swinging the Wii-remote around frantically you will overlook minor details like MIDI audio and the fact that you're playing what looks like an overclocked GameCube title. If you have a Wii (or even a GameCube) it's simply a must have.



Developer [Nintendo](#)
Publisher [Nintendo](#)
Website www.nintendo.com.au

Players 1
Other platforms [GameCube](#) (sort of)

VERDICT

Wii-remote sword fighting; awesome story; 50 hours of classic Zelda; wolf form.

MIDI audio; rehash of the GameCube version.



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Heroes

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NBC's new series *Heroes* will pull you free of the seemingly inescapable grip of JJ Abrams' *Lost*. Seriously – we can't even remember

what that silly show was about. It's that good.

Heroes features a few recognisable faces, including Ali Larter and *Mysterious Ways'* Adrian Pasdar, but a majority of the cast is recruited from the ranks of the unknown. Genetics, Darwinism and evolution serve as the foundations of the show, with most of the main characters 'suffering' from some sort of cellular mutation. The ways in which the symptoms of these mutations manifest however, is what will hook you in. For instance, schoolgirl Claire Bennet can spontaneously regenerate her body, making her almost invincible, while painter Isaac Mendez can draw the future – but only when he's high on drugs.

Now, the idea of *Heroes* is hardly new. In fact, the basics are ripped straight from an *X-Men* comic (and even more so from *Babylon 5* creator J. Michael Straczynski's comic, *Rising Stars*) – but the treatment of the content is definitely original. Our heroes are not spandex-clad supermen and women, rather they're ordinary people with reasonably ordinary lives. Mother Niki Sanders may have what appears to be super strength, but she also battles with Split Personality Disorder brought on by the stresses of her life. This mix of normal elements grounds the show in reality and stops it spinning completely into the realms of fantasy.

The plot is so completely absorbing that sponges the world round are dropping toasters into their bathtubs. From Claire's father, the incongruous 'Mr Bennet' and his Haitian bodyguard who can wipe memories, to Mohinder Suresh, son of the murdered geneticist who discovered the signs of the mutations, and finally to Syilar, the insane killer who seems to target only those with powers... the number of players and schemers seems endless.



Rachel Bils-uh, we mean Nora Zehetner plays Eden McCain.

Reportedly, rather than produce the show episode by episode with nothing but a thin outline of where the plot will go, creator Tim Kring has planned out the entire series from beginning to end. So we shouldn't have to worry about, oh, we don't know, someone accidentally guessing the mystery of the series and the creators being forced to come up with something else on the fly.

So, if the meandering plot of *Lost* has dulled the pull of your magnetic anomaly, then you really have to check out *Heroes*. Just tune into Channel Seven at 8:30 on Wednesday nights, and fall in love like the rest of us have. **LB**

LE

score

9.5
OUT OF **10**

WIN STUFF!

5 copies of Fullmetal Alchemist: The Conqueror of Shambala!

Yes, you too can laugh at the antics of Edward and Alphonse... all you have to do is visit www.atomicmpc.com.au/competitions, click the FMA link, answer a question and you'll be in the draw! Cheers to Madman for this, ah, mad prize.





Tsotsi



Distributor The AV Channel. Director Gavin Hood
Starring Presley Chweneyagae
Web www.tsotsi.com/english/index.php

Tsotsi is a film that will leave you numb, just physically numb for maybe an hour after you've seen it. The tale of a young gangster in the slums of Johannesburg, who finds himself caring for a baby after shooting its mother in a carjacking, is equal parts beautiful and ugly, touching and disturbing.

This certainly isn't something you should watch if you want to relax or are feeling a bit down, but it's essential viewing all the same. While there is nowhere near as much violence in this film as there is in *City of God*, what there is, is equally unsettling and horrific. At the start, for instance, *Tsotsi* and his gang follow an elderly man onto a peak hour train before cornering him, murdering him and stealing his possessions – right there in front of all the other passengers, none of whom seem to notice or care.

It's hard to find fault with *Tsotsi*. At a mere 90 minutes, you can't really say that it's too long. The writing and the pacing are all spot on, the acting perfect. The soundtrack, a mixture of classic African sounds and modern hip-hop, is flawless. The character development, particularly of *Tsotsi*, is realistic. This is a shockingly brutal but incredibly touching tale of redemption. Without a doubt, this is an unforgettable cinematic experience that is more than worthy of your time and your money.

CT

Score
9.0
OUT OF 10

Kenny



Distributor The AV Channel. Director Clayton Jacobson
Starring Shane Jacobson, Eva van Buren
Web www.kennymovie.com

The critics were wrong. *Kenny* is not the funniest Australian movie in the history of forever. Sure, it has its comedic moments both subtle and puerile, but it really isn't that amusing. What it is though, is perhaps one of the saddest and sweetest films this here local industry has ever produced.

It's a mockumentary about the day-to-day life of a toilet plumber called Kenny. He lives in Melbourne, is divorced and has a young son. He makes a lot of jokes about poop and yeah, he's all philosophical-like and kind of a nice guy. But that's not what makes this film remarkable. Rather, it's the realism that hits home. Kenny is – excuse the pun – pretty much shat on by the world around him. People order him around, talk down to him and fail to recognise that he's happy or even a goddamn human being. And he just takes it. He'll be talking to someone, their phone will ring and they'll just walk off without apologising or acknowledging him. He'll get abused for not having the toilets spick and span *right the hell now*. If you've ever dealt with the public, you'll know just how accurate it all is.

Kenny is one of those films that you'll either really enjoy or just be left cold by. Viewed as a straight comedy, it's not that spectacular. So watch it for what it is – a homage to those people we ignore.

CT

Score
7.5
OUT OF 10

ANIME OF THE MONTH

Fullmetal Alchemist: The Conqueror of Shambala

Studio BONES Distributor Madman Web www.madman.com.au Price \$29.95

Based on the anime series of the same name and directed by Seiji

Mizushima, *Fullmetal Alchemist: The Conqueror of Shambala* is like whipped cream and cold pizza – although no one would think of putting them together, once they do, they're in for a tasty treat. Much in the same way, *Shambala* combines Hitler, gypsies, alchemy, racial tension, and parallel worlds in the one scrumptious plot.

The story opens with Edward Elric, main protagonist and fangirl beloved. Ed is trapped in a parallel world after sacrificing himself to bring back

Your regular dose of anime goodness courtesy of our resident expert Amma Soemino.

the body of his little brother, Alphonse. This parallel world happens to be 1923 Munich and the tension of post-World War I Germany is captured extremely well. It's a pretty good history lesson, as most of the references made to Nazi members and even Hitler's supposed obsession with the occult rings true. The Nazis intend to open the gateway to Ed's home, Shambala, to harness the power of alchemy to aid them in their coup to overthrow the current government. Ed is trapped between wanting to return to his world and his brother, but knowing that it could wreak havoc on both dimensions.

FMA fans will absolutely love this movie. But if you haven't seen the *FMA* series we suggest you watch at least the last two episodes as the movie refers to them. Overall, the fight scenes (especially between the Homunculi Wrath and Gluttony – need we say more!) are spectacular and the music is awesome, but really, *The Conqueror of Shambala* is just an extended episode with the closure that diehard fans have sought.

Score
8.5
OUT OF 10



The kids are alright

Kate Inabinet wants you to think of the children. Just not the bad ones.

First it was rock and roll, then it was heavy metal, now it is video games. Adults will look to anything for an excuse to blame their child's errant behaviour on something other than their own bad parenting, or the presence of a birthmark that reads 666 hidden under their kid's hairline.

It's not just parents, or our overly excitable witch-hunting media that wield the pitchfork at games companies: Jack Thompson, the kooky lawyer with a bee in his bonnet about everything in the whole entire universe has embarked on a personal crusade to ban any game that depicts violence of any form in the belief that exposure to such video games is corrupting our 'innocent' youth.

Not that dear old Jack needs any encouragement when it comes to his increasingly fanciful conjectures, but the latest murder spree in Germany by a couple of teenage boys has done little to dispel his theory.

Unfortunately, the kids involved had chosen to alias themselves using the names of characters from Final Fantasy 7. Naturally, the media pounced on the link but it's hard to believe the boys could have been trying to emulate the characters Reno and Sephiroth when they chose a simple run of the mill stabbing murder and hostage situation, rather than 'defeating' their victims using hit points and magical spells in turn-based combat.

It's all too easy to lay blame at the feet of the games industry, but is our youth so innocent? Let's face it. Kids are violent. Long before they have even learnt how to talk, babies will frequently scone each other on the bonce with their wooden play school blocks when encouraged to 'share' their toys with other children. Little kids think nothing of pushing each other off the swings in the preschool playground, or biting, scratching, pulling hair and kicking each other in the goolies when adults aren't looking. Siblings frequently fight 'to the death' and schoolyard bullying has been around as a source of entertainment long before video games were even conceived.

It's all very well for grown-ups to tell children to behave appropriately when they, as the very people attempting to set an example, are fighting tooth and nail with each other over the last Cabbage Patch doll in the toy store for their precious offspring, beating each other to a bloody pulp over a stolen car space, or consistently breeding child-eating dogs.

If it is true that our children are being corrupted by what they see, then point the finger at the entertainment industry as a whole, not just games or music.

One week's worth of TV is a veritable how-to for future murderers with a line-up such as *Law & Order*, *CSI*, *NCIS*, *Medium*, *Cold Case*, *Numb3rs*, *Midsummer Murders* and *Raising The Dead* to name just a few. Not only can you learn interesting and creative ways of killing people, but if you watch carefully, you can also learn how to get away with it.

Also, according to 'authorities' like Jack Thompson on the matter of what is causing our youth to be led astray, it would indeed prove beneficial for our children to have all references to violent acts removed from their tender sight. Abolish history lessons in schools because they could – under the same theory – encourage kids to assassinate presidents, or form bloody

political coups, or burn people at stakes.

Get rid of the news as it covers all acts of brutality with such relish – especially the ones supposedly influenced by violent video games. No more mentioning rapes, murders and robberies, and definitely no coverage of the war.

In fact, war should be banned altogether for being far too violent.

Where is a Jack Thompson crusade when you really need one?

Drop Kate an email, but if you want to avoid violence make sure it's polite and doesn't piss her off.

geekette@atomicmpc.com.au

“Abolish history lessons because they could encourage kids to assassinate presidents.”



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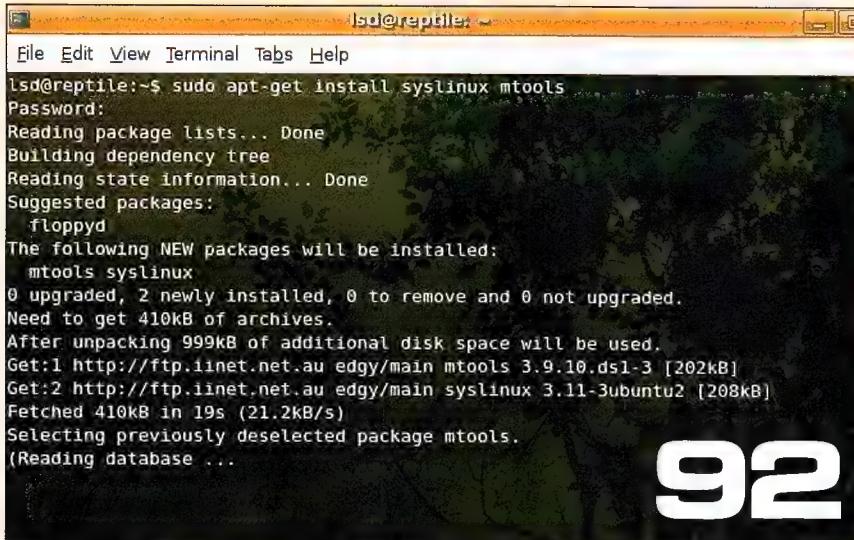
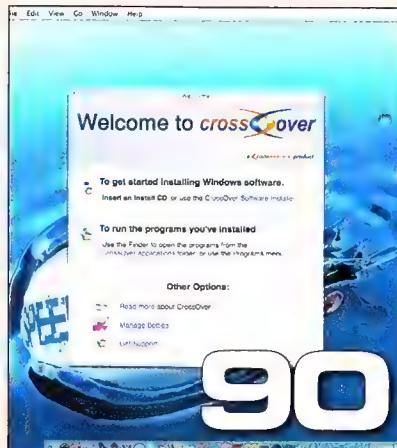
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TECHNIQUE

HANDS-ON TUTORIALS FOR THE TECHNICALLY INCLINED

Atom's incredibly intelligent and resourceful modders continue to do their godly work for us this month. PC case magician Luke 'Defyant' St Clair displays his Supreme Commander case with included worklog.



Jake Carroll wraps up his trilogy on Mac OS virtualisation and Leigh Dyer has just the thing for those running Linux and no floppy to flash with.

We can almost hear your sighs of relief.

TECHNIQUE CONTENTS

Supreme Commander case log 86

Luke 'Defyant' St Clair builds yet another marvellous case. This time, it's Supreme Commander-themed and it's damn good.

Running multiple OSes under Mac, Part 3 90

It's the final part of Jake Carroll's mammoth Mac virtualisation guide. Get into it!

Floppy-less BIOS flashing in Linux 92

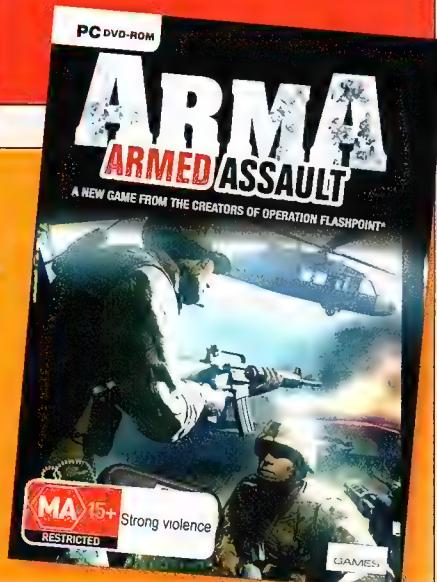
No floppy on hand, running Linux and your BIOS needs a flash? Leigh Dyer has the solution.

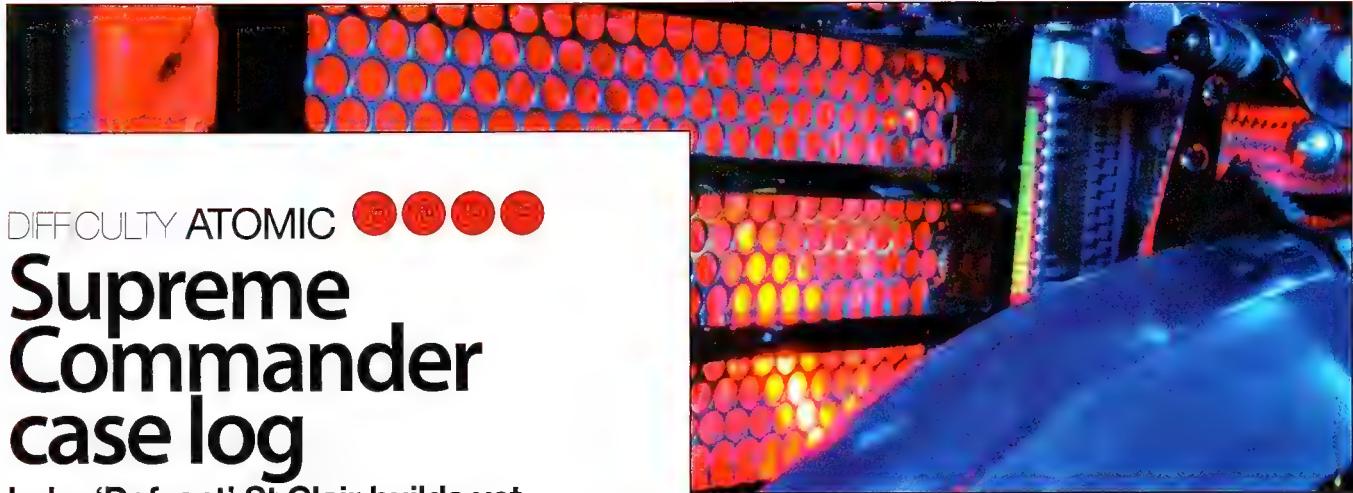
Win 1 of 10 copies of ArmA: Armed Assault

www.atomicmpc.com.au/competitions

Operation Flashpoint was an awesome game. Seriously, it is the granddaddy of titles like Battlefield 1942. Except Flashpoint was even better. Now the unofficial sequel is with us.

If you demand more from your large-scale first person shooters, then ArmA: Armed Assault is the only game for you. Featuring the gameplay of Rainbow Six and exceptional graphics, ArmA: Armed Assault is going to go off. And it could go off on your PC. Just visit the competitions URL above, click the ArmA: Armed Assault link and answer the question you see there! Thanks to Red Ant for these great gifts.





DIFFICULTY ATOMIC



Supreme Commander case log

Luke 'Defiant' St Clair builds yet another great case, this time in the theme of the Total Annihilation successor, Supreme Commander.

Supreme Commander is shaping up to be the RTS game we've waited for since the days of Total Annihilation. Epic battles on massive maps with huge numbers of units wrapped up in lots of 3D eye candy. It's been a long time between RTS drunks but it looks as though the drought is over.

I personally didn't get a chance to play the beta test but have followed all the news on this game since first hearing about it and it's great to see the game has gone gold. In fact, there's a review on page 74!



The main ideas for this mod were taken from two pieces of concept art and one shot of the in-game unit selection screen, although I looked through nearly 100 different pictures and these were the ones that gave me the main ideas to work with. As such, the box is made up of the following elements:

- 1) The large red panels of the jet fighters wings. This will be the mod's new external and internal red panelling.
- 2) The large vents and ports from the Supreme Commander 'bot'. This idea will become the mod's new front intake and internal exhaust grills.
- 3) The sexy red radar grid from the unit selection screens. This will become the mod's new left and right side windows. Throw in some water-cooling, a side-mounted, custom-made water tank, high performance hardware and the Supreme Commander case is ready for some RTS action.

Case and mods

For the mod, I decided to go with Antec's new Nine Hundred. It's a solid, robust case with some nice features that fits in perfectly with the planned mod, especially the water-cooling installation.

The Nine Hundred's dual front 120mm fans are well suited for cooling an internal Black Ice Extreme II radiator. The Nine Hundred's massive 200mm top fan and rear 120mm fans will also work perfectly as exhaust fans to remove the case's unwanted heated internal air – very important when considering any water-cooling installation.

'Radar grid' windows will feature on both sides, with laser-cut outer red panels. The Nine Hundred's top recessed area will get a new tinted grid window panel that will display a Matrix Orbital LCD. The front of the case will get a full work-over with laser cut dual 10mm thick gloss Perspex grills a new red front panel and a very sexy CD-ROM door make over.

Internals will be clean, with gloss-red Perspex panelling, black flex-covered wiring and some nifty bracketing. The main feature of the SupCom's internals will be a full custom half-inch water-cooling installation that will feed out to a massive custom-made side-mounted water tank.

1

Stripping the Nine Hundred back to a bare chassis was the best way to start this mod. Being full metal rather than alloy allows the case to easily deal with the extra weight of the water-cooling and panelling.

The first step is to design, cut and fit a bracket to allow the BIX-II radiator to mount into the existing HDD bays of the Nine Hundred. A 120mm hole is drilled, and the side is drilled and tapped. When bolted to the radiator the unit can then be attached to the original HDD mount holes.



2

The original fans are given the flick for three sexy LED red Antec TRICOOLs. Two are fitted to the new bracket to make a single modular unit. The third is used to replace the case's stock rear fan.

**3**

A section of the case's side and HDD bay are cut away and rubber trimmed to allow the internal mounted radiator to draw coolant from the external water tank. A 90° copper bend is used to replace the radiator's original straight barb. A 90° bend is used to avoid possible hose kinking that may occur.

**4**

Once the modding design concepts have been transferred to EPS files it was off to the Plastix centre in Sydney to get nearly \$600 worth of custom laser-cutting done. Laser cutting is expensive but it can achieve a precision that cannot be done by hand.

The major expense is the incredibly intricate Supreme Commander badges. Even with the precision of the laser cutter the smaller badges still had some minor warpage but the large front logo came out looking superb.

**5**

The next step is to start installing the internal red panelling and transform the internals. As tempting as it is to install a motherboard cover, we decided against it. A back, side and HDD panel were fitted and the Antec 500W PSU also received a new matching red Perspex housing to complete the internal red theme.

**6**

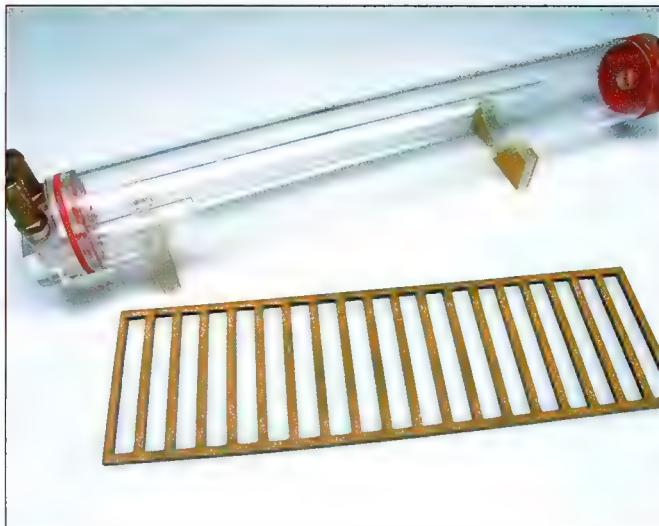
The covered PSU, Swiftech MPC-650 pump, GeForce 7950GT video card, massive 300GB HDD and Swiftech water blocks were then installed.

Rather than go with a full wire steaming of all the cables, I went for a uniform look using black split auto loom and some custom made clear Perspex brackets to hold the covered loom in place. A similar idea to the clear Perspex brackets is used to hold the half-inch Clearflex plumbing in place. Single strips of 3mm-thick clear Perspex are hot-air heated and bent around Clearflex off cuts to make custom hose holders. A small red-sided cover is added to the pump and the internal plumbing is ready for its custom water tank.



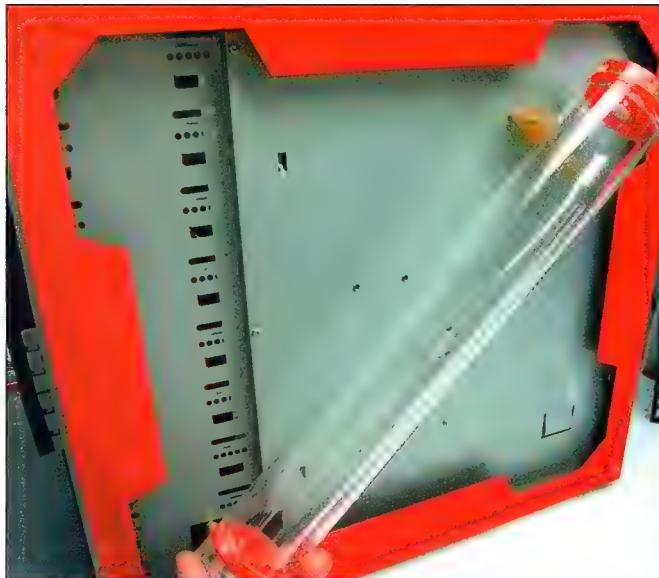
7

The 420mm long reservoir/water tank was going to be a major feature of the SupCom case mod. It is made from a single cut 390x58mm piece of clear Perspex tubing. The two ends are each made from three pieces of laser-cut 58mm caps that are glued together, taped and glued to the tube. Internal smaller tubes help to feed the water in and out without catching and without air bubbles caused by flow turbulence.



8

The reservoir is attached to the side of the case using the off-cuts from the original laser cutting of the end caps. These are cut in half and glued directly to the reservoir, the thread tapped and bolted through the motherboard side wall of the case. A custom black side-guard is also laser-cut, heated and attached to the reservoir using silicon tape. This will prevent it from being scratched when it's hauled from LAN party to LAN party.



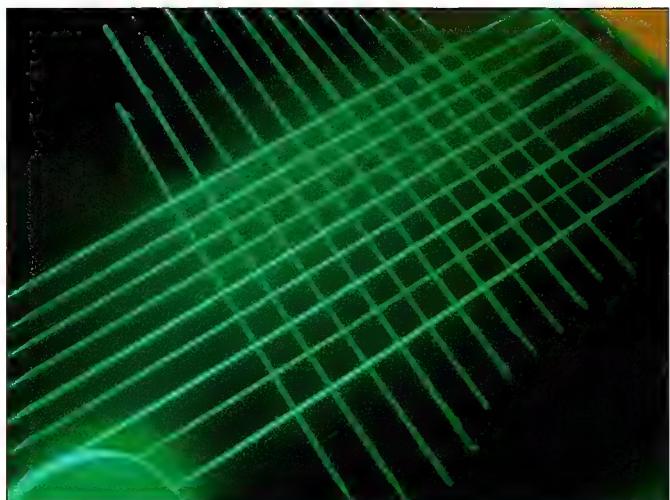
9

In stock form, the top of the Antec Nine Hundred is the case's main feature. Apart from additional red paneling and red SupCom logo, I decided to add a themed grid panel and LCD readout display. A Matrix L.I.S 20x2 LCD display is removed from its original brackets and mounted into the recessed area of the top section. Some matt black paint helps the display to blend in under the new tinted top 4mm-thick grid display window.



10

To achieve the 'grid' radar look, a clear piece of Perspex is scored in a grid pattern using a sharp tungsten scoring tool. The edge of the Perspex is lit using an LED and the light is caught in the scratched grid as shown in these test shots. A tinted Perspex cover is cut and added over the top to add the dark effect. This technique will also be used to make the larger side panels. Next job is to add the SupCom logo. Some fine finger and glue work is used.



11

The sides of the SupCom case will use the same grid design as the smaller top window. Again the grid pattern is scored into both windows. The case's original side panels are cut away to accommodate their new windows and new outer laser-cut red panels added. A large red neon is fitted internally at one end to carry the light through the scratched grid illuminating the window. This can be adjusted to control the amount of light saturation that carries through the side window.



12

The front of the standard Nine Hundred case is totally transformed. Two 10mm thick laser-cut gloss black grills are added to a new red front panel. The new front is glued together in three sections then hot-glued to the Antec Nine Hundred's



gutted front panel. MNPCTECH mesh is used to stop any nasties getting through to the front fans. The CD-ROM door is a tailor-made piece of hand 'widdling'. Two 10mm thick pieces of gloss black Perspex are glued to a single piece of 3mm-thick gloss red. The initial shape is rough-cut on the hobby saw and an hour or so of hand sanding and polishing gives the case a one-off classy looking CD-ROM door. The new door is attached using and adaptor plate that is bolted to the CD-ROM's original tray. An eject button is added just below the right side of the door.

**13**

With the front, side and top done and attached to the case, the blue Cooler Master coolant can be premixed and added through the water tank. The pump is primed and left to run overnight with the system off to remove unwanted air in the system. The OS and extra software are installed and case shipped back to the *Atomic* crew to be passed on to its new owner.

A huge thanks to Nintek who went above and beyond the call of duty in supplying the parts needed on time. And to PC Case Gear and especially to Samsung for supplying the two very sexy matching LCD screens. Also to the guys at *Atomic* for running yet another awesome comp and giving me the chance to do what I love best. 





DIFFICULTY ATOMIC

Run Linux, Windows and others under Mac OS X Part 3

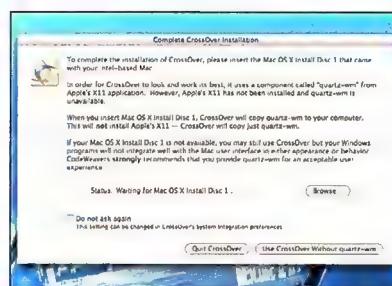
Jake Carroll divulges the last of his carnal Mac knowledge to the awaiting masses.

One of the key elements that Apple pushes to consumers is that Mac OS X is very user friendly. It loves UNIX, it enjoys Windows, and doesn't mind your girlfriend either. In other words, this is very much an OS for those that care and share in multiplatform environments. Over the past few months, we've explored ways that this friendly association can be capitalised on using techniques such as virtualisation and resource sharing, but there is an aspect of this integration that we haven't covered yet: WINE and Codeweavers Crossover for Mac.

Wine Is Not an Emulator

It is not an emulator. Remember that! WINE is simply a binary with associated libraries that allows the execution of DOS and Windows based programs within a UNIX environment (Mac OS X, Linux, BSD, Solaris and other UNIX-like systems). This is achieved through a set of libraries that implement the Windows API calls using their UNIX and X11 counterparts.

Here is the tricky bit that defines what WINE does and doesn't do – it doesn't emulate. Instead, it directly passes instructions from your programs to your x86-based processor. This theoretically results in little processing overhead. Don't expect WINE to give you a whole encapsulated operating system with virtualised devices, such as the glamour tools



▲ Figure 1 – The Codeweavers install. It weaves code, it does.



▲ Figure 2 – Let it know exactly what you want to do.



▲ Figure 3 – Select Steam and continue. That wasn't so hard.

we've been playing with for the past few months. It will, however, let you run tightly integrated applications in a foreign operating environment. A trivial example of this is running Office 2007 Enterprise Edition for Windows XP/Vista on Mac OS X. You could virtualise a whole operating system and run it inside of another using Parallels or VMware Fusion. The alternative is that you

could just elect to use WINE libraries and run individual applications.

Again, it is important to note that WINE is not a CPU emulator. It doesn't emulate instructions; it simply passes them as they are called from an application to the real, physical CPU through a lightweight compatibility layer.

Lost in translation

Let's take a look at Codeweavers Crossover installation and setup. The entire package can be obtained from www.codeweavers.com.

The installer will ask for some of the OS X base Quartz packages. You probably should do this. You need to do this using your current Mac OS X Installer disk. The Crossover installer will seek out, extract and install the quartz-wm packages. Quartz-wm is Apple's branded X11 window manager. Without the Quartz-wm, none of the native 2D hardware acceleration or seamless integration into Aqua would be possible.

Following this, you will be greeted with a screen asking what you want to do. This is like the base of operations.

Let's do what it says and start a Windows application install with Crossover. Click on the blue link, or let a CD autoplay. In theory, the



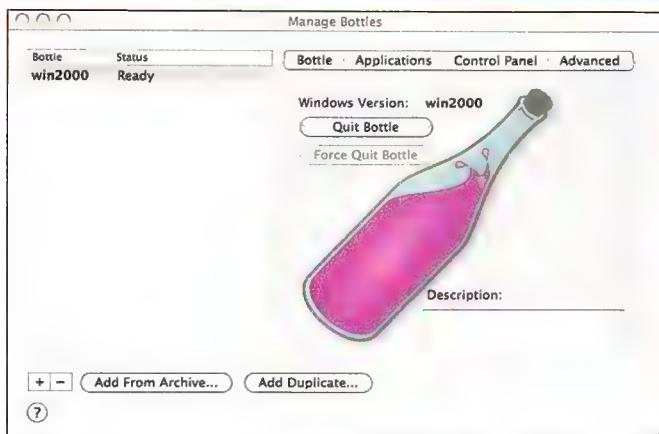
▲ Figure 4 – Choose an installation directory and let Crossover work its magic.



▲ Figure 5 – The Steam installer.



▲ Figure 6 – Steam doesn't have a clue what's going on.



▲ Figure 7 – Bottle configuration main screen.

application will autodetect an MSI or EXE package. Look through the list that is presented. You will find 'Steam' in there, so select it and continue.

At this point, Crossover gets a little bit spiffy, where it will offer you a download location for the Steaminstall.exe. We opted for a local-install from a different source, as can be seen in Figure 4.

If things are going according to plan, you will notice a little 'X-windows' style window come up, with the installer inside. Shown in Figure 5 is our Steam installer running smoothly in the X-windows Crossover bottle.

Bottle some of that, will you?

Just what is this bottle business? Can it be used to maim others in football riots? (No reference to old school arcade-emulation intended). Bottles are a method of enclosing library and OS layer compatibility data within Crossover for Mac. Within a bottle, a whole Windows registry can reside, as can a whole standard directory structure. In normal Mac OS X directory structure, we have standard UNIX-like filesystem layout:

`/Users/foobar/directories.go.here`

In Windows, directory structures oftentimes take the form:

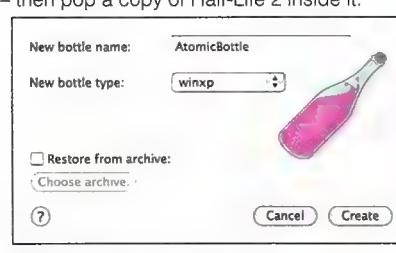
`C:\Documents and Settings\Users\foobarsheep\stuff.goes.here`

Notice that in a UNIX-like environment, the directory structure doesn't appear absolute to the physical drive, but in Windows, it does. This presents a few problems when accessing physical devices. Codeweavers came up with the bottle concept to enclose or encapsulate all the settings needed so that Crossover/WINE will see an obvious C:\files\go\here style path. Figures 7, 8 and 9 illustrate bottle configuration. The advanced tab in Figure 9 shows the ability of Crossover to disassociate itself with certain file-type extensions and force applications to ignore it.

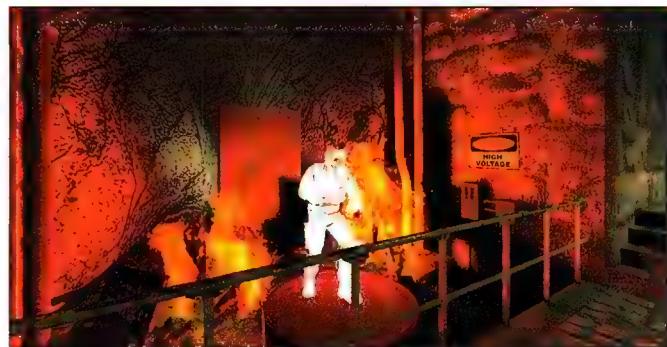
A real world test

Codeweavers and the WINE development team suggest that the overheads are negligible in implementing this translation layer. Being *Atomic*, we like to test these things out. We decided to take out our Steam bottle and associated install – then pop a copy of Half-Life 2 inside it. Benchmarks ahoy!

We started out by running Crossover, then inserting the HL2 DVD into the drive. Crossover detected an EXE and MSI installer but we opted to do an 'Advanced Install' on the packages. We selected our current Win2000 bottle



▲ Figure 8 – Windows in a bottle.



▲ Figure 10 – Shader Model 2.0 path issues – the man who should be transparent.



▲ Figure 11 – Shader 2.0 path issues – beware the black water. This is what happens when you cross the streams, or Steams. Whatever.

– and let the standard HL2 installer do the rest. Once the HL2 package was installed, we let the Steam client and HL2 binaries update to the current version. This included updates to Counter-Strike: Source. Once the updates had processed, we started up the Counter-Strike: Source Video Stress Test.

Immediately upon initialising the video stress test, things were not quite right. Figures 10 and 11 demonstrate shader rendering issues. It appears that Shader Model 2.0 paths have not been displayed correctly, despite having direct access to the ATI MOBILITY RADEON X1600 series GPU inside our Macbook Pro.

When the test had run to completion, we noticed a framerate average of ~28 FPS. For 1440x900 in 32-bit colour, this is about what we'd expected from a mobile X1600 GPU running with the additional overheads of a translational instruction layer.

These results suggest a couple of issues with the process of instruction conversion, and indicates that we can't always rely on 3D hardware acceleration to be perfect under a WINE environment. Part of this comes from the fact that WINE doesn't understand anything but raw HAL and a simplified Direct X 9.0b implementation (so far). In time, this will be rectified by Codeweavers. Shader Model 2.0 issues aside, Codeweavers Crossover for Mac is a nifty product – we've just asked it to do a little more than it can handle. The current list of fully supported applications resides here: www.codeweavers.com/compatibility/browse/cat.

This impressive list of applications is designed to give the end user an idea of 100% compatible applications. We trialled installation of Elaborate Bytes CloneDVD2 and AnyDVD, as a means to verify this level of compatibility and were pleased to find seamless functionality. Yay, region-free Mac DVD drives!

It has been a whirlwind ride. We've seen the most extravagant and technologically advanced virtualisation and cross platform interoperability options known to man in the past months. There is good news for us on the horizon, and this is only just the beginning. If you can dream it, you will be able to run it.

Eventually. Trust us. ☺

DIFFICULTY EASY



Floppy-less BIOS flashing in Linux

Leigh Dyer instructs us in the less-than-ancient art of making virtual floppies.

The floppy is dead, and the world is a much better place for it. Unfortunately, some people didn't get the memo and some tasks, like flashing your motherboard BIOS, still seem to call on those crappy little disks to get the job done. Most motherboard makers now offer Windows-based flash tools, but if Linux is your only OS that doesn't help at all.

Thankfully, you don't really need a floppy – you just need bootable DOS, and there are a few ways to get it. You can burn bootable CDs, or use a USB flash device, but we have an even easier method. Say hello to the hard-drive-based virtual floppy!

Bring on the virtual floppy

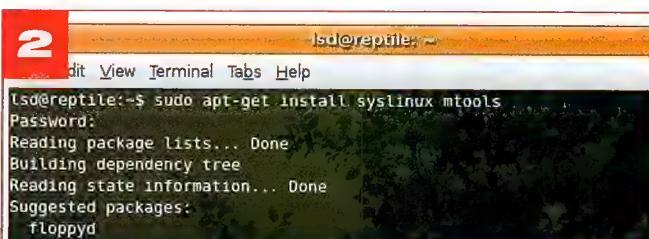
Boot loaders can do some neat tricks. In this case, we're using syslinux, a package of boot loaders that can boot Linux from DOS filesystems, CDs, and network servers, among other things. It also includes a loader called 'memdisk' that works as a kernel, to be loaded by another boot loader. In combination with GRUB, the boot loader used on just about all recent Linux systems, memdisk can load a floppy image from your hard drive into RAM, and then boot from it, just as if it was a real disk.

We'll also need a DOS boot disk, but that's easy – FreeDOS, a highly-compatible open source re-implementation of DOS has just the thing.



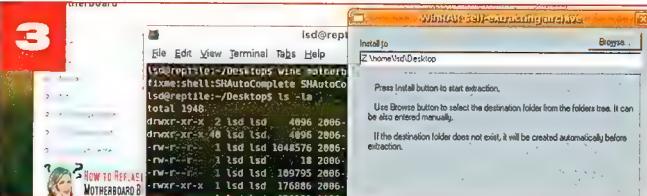
Visit the FreeDOS bootdisk website www.fdos.org/bootdisks and download the 'FDOEM.144.gz' image, which you'll find near the bottom of the page. This image has the bare essentials needed to boot and nothing more, so there's plenty of space, even for 1MB BIOS images. Use 'zcat' to extract the image file while keeping the original archive intact:

```
zcat FDOEM.144.gz >dosdisk.img
```



Install syslinux, and mtools, a package that lets you work with DOS disks. You could mount the floppy image and copy files in that way, but mtools makes life much easier. On Ubuntu, this will do the trick:

```
sudo apt-get install syslinux mtool
```



Download your motherboard BIOS image, and the flash utility if the image file doesn't come with one. If the BIOS download is an EXE file, it may be a self-extracting ZIP archive, so try unzip on it:

```
unzip flashimage.exe -d bios
```

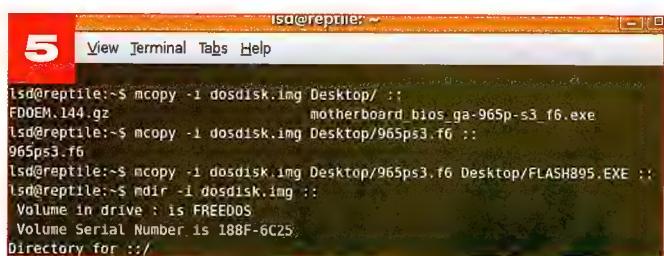
If that doesn't work, you might have luck using WINE to run the file and extract the contents.



Use mtools to copy the BIOS image and flash utility in to the disk image; 'mcopy' performs the copy, while 'mdir' confirms the results:

```
mcopy -i dosdisk.img 965ps3.f6 FLASH895.EXE ::
```

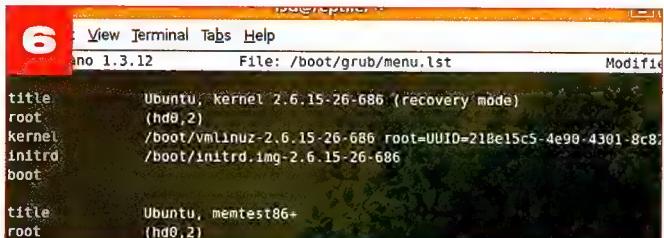
```
mdir -i dosdisk.img ::
```



The image is now ready to go, so we need to set up GRUB to boot it. Create a folder under /boot and place a copy of memdisk and your disk image in it:

```
sudo mkdir /boot/biosflash
```

```
sudo cp dosdisk.img /usr/lib/syslinux/memdisk /boot/biosflash
```



Edit your GRUB configuration file (usually /boot/grub/menu.lst) and add the following lines:

```
title BIOS Flash
```

```
kernel /boot/biosflash/memdisk
```

```
initrd /boot/biosflash/dosdisk.img
```

```
boot
```

If your /boot folder is on its own partition, rather than on the root partition, you'll need to remove '/boot' from the lines above. Also, on an Ubuntu system, make sure you place these lines after the 'END DEBIAN AUTOMATIC KERNELS LIST' line otherwise they'll be removed on your next kernel upgrade.

After rebooting the system you should see the 'BIOS Flash' option in your GRUB boot menu. Select it, and your floppy image should boot, dropping you at a DOS prompt. Follow your motherboard maker's instructions to run the flash tool and update your BIOS! ☺



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Fix time

Daniel Rutter can feel the power. The power to put things broken in their place. Email your broken things to io@atomicmpc.com.au.



The mystic TV finger

I When I place my finger over the 'RF' connection on the back of both TVs I own, a faint but steady signal is produced. I can actually make out an image from whichever channel is tuned in on the TV. How is this possible?

I'm guessing our body holds and emits radio waves etc, thus providing enough reception to at least 'channel' something of an input signal. Very weird!

Woody

O A receiving antenna is just a conductor that's sitting in an electromagnetic field, which induces a current in that conductor. As the human body conducts electricity, it works as an antenna just like anything else the same size and shape with the same resistance would.

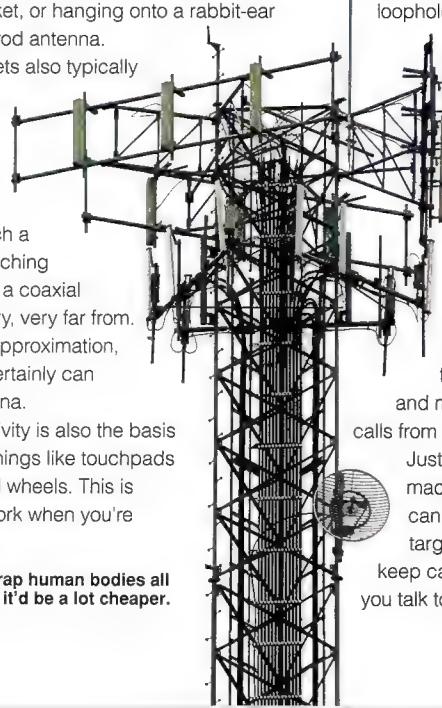
Now, the human body doesn't conduct electricity very well, and it's pretty far from being an optimal shape to pick up anything, which is why you'll never get a good picture from a TV or good sound from an FM radio (AM antennas are typically small wire-wrapped ferrite rods inside the radio) if you're just standing there touching the antenna socket, or hanging onto a rabbit-ear or simple single rod antenna.

Antenna sockets also typically expect to be connected to an antenna with a particular electrical impedance, which a human finger touching both terminals of a coaxial socket will be very, very far from.

But, to a first approximation, a human body certainly can work as an antenna.

Body conductivity is also the basis of operation for things like touchpads and modern iPod wheels. This is why they don't work when you're wearing gloves.

If we could just strap human bodies all over these things, it'd be a lot cheaper.



Thank you for calling! Die in a fire!

I After receiving a really annoying telemarketing call just before dinner the other day, I wondered if there was any way to stop them from getting through.

I don't know a whole lot about phones, but in the office environment you can call extensions to reach different departments, so I was wondering if I could perhaps set this up at my home? So if someone calls my number they then have to dial an extension to reach me, effectively stopping those troublesome calls.

Tom

O I don't know whether there are any specific anti-telemarketer devices in Australia. There are plenty of them in the USA, where telemarketing has been a plague for years (particularly lucky recipients there could expect dozens of calls a day, though things are improving now...). But the US gadgets aren't legal to plug into the Australian phone system, and won't necessarily work here anyway.

Australia is meant to have a Do Not Call Registry by May 2007. It's got the usual loopholes (charities and politicians can still pester anyone, for instance), but it should be better than the previous Australian Direct Marketing Association list, which was a voluntary deal and widely ignored.

Caller ID is standard for many ordinary home phones these days, but it's not much use against Australian telemarketers. It's normal for telemarketing calls here to be from unlisted 'private' numbers, and many people get plenty of valid calls from unlisted numbers as well.

Just setting up an answering machine and screening your calls can help, but only if you don't get targeted by telemarketers that just keep calling and calling and calling until you talk to them.

I/O OTM wins a Logitech G5!

There's a mouse in the house. Okay, it's not in the house, it's in I/O. And it looks damn good.



While we wait for the new Do Not Call list, the best option we have, besides getting an unlisted number, is just telling every caller to remove you from their list. This does usually work, for each individual calling organisation.

If some particular group keeps calling anyway then you could try complaining to the Federal Privacy Commissioner or ACCC or Telecommunications Industry Ombudsman or something, but don't expect a great return on that investment.

This to that

I'm trying to find a device that will convert analogue RCA audio connectors to TOSLINK digital. My Xbox 360 and PS3 both have TOSLINK, but my Wii doesn't.

If I could find such a device it would greatly simplify my home audio setup because all three systems could be routed through my cheap switcher box and share the same input on my TV/receiver. I'd even be happy soldering it up myself if I knew what to buy. Any ideas?

I suppose the other option would be to just use the RCA connections on all the consoles, but it seems like the digital connections would be the way to go. Maybe you have some thoughts on that as well? My stereo is 7.1 capable and the surround sound really does help with immersion into the games.

Jerry

O There's no such thing as what you want, at least not as a small and simple device. I think the main stumbling block would be that such a device would need to have level adjustment (or a compressor or something), because otherwise any time the input signal clipped, the output would sound terrible. 'Line

level' is a variable enough concept that just setting the device to accept some arbitrary maximum signal level without clipping would mean its output would be far too quiet most of the time.

There are, of course, professional audio doodads that do what you want, the price listings being as usual led by a Behringer product, the Ultramatch Pro SRC2496, for \$250 or so.

Pro gear like the Ultramatch almost always wants balanced input, though, not crappy two-conductor RCA. So you'd need a 'DI box' as well, to convert the RCA to balanced XLR.

I think you'd do better to just put that money towards a receiver with more inputs.

Hairy palms are another warning sign

I recently upgraded my GeForce 7900 GTX to an 8800 GTX, and am getting bad eye strain.

Just for normal use (even Internet use), after 20 to 30 minutes my eyes feel strained, and if I get up and do something they feel blurred, and sometimes I'm even dizzy.

I previously used a 7800 GTX, then the 7900, and no probs.

The only other upgrade I did was an Athlon XP 4800+ CPU, and I flashed the BIOS. Everything seems to run OK, I have the card set at 60Hz (my Samsung 931C monitor shows it as 64.1kHz scan rate, 60Hz

frame rate), and there is no visible problem.

Any help would be great, as this is preventing me from using my beautiful new card.

Matt Smith

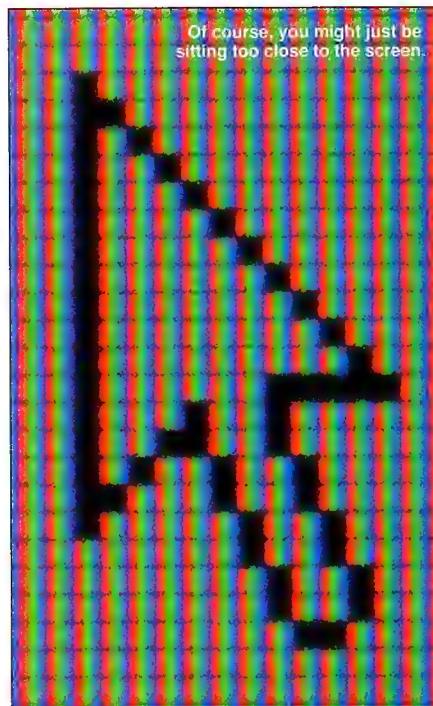
O If you had a CRT monitor then my reply to this would, obviously, be along the lines of OMG NOOB ITS FLICK3R U SUK.

Seeing as you have an LCD, though, it shouldn't ever have visible flicker. It shouldn't even be easy to tell if you've switched between the analogue and DVI *inputs* for your monitor, and that shouldn't have anything to do with eye strain anyway.

You probably would have noticed if everything was fuzzy because you were using a resolution other than the monitor's native one. But even that shouldn't do your eyes any harm, unless you're unconsciously squinting all the time or something.

So, with all of that eliminated, my first guess is that there's actually something organically wrong with you, and it just coincidentally got bad enough for you to notice after you changed your video card. It could be some ghastly disease – there's a long list of obscure and terrible neurological complaints that start out with eyesight disturbances – but it's much more likely to just be the normal eyesight deterioration that everybody can look forward to as they get older.

Eyestrain, blurriness, even dizziness; all standard symptoms for someone who



needs glasses but hasn't have any... yet.

So I suggest you visit an optometrist. You may not be happy to discover that you now need glasses (or a change in prescription, if you already have them), but you're doing yourself no favours if you put it off.

I/O OF THE MONTH

NotZZZZ woSSTrth the moneSSSZTy

I I have just bought a Creative X-Fi Platinum, but it doesn't work properly. It pops and crackles and clips all the sound.

I have been through hell with Creative and all it is doing is running me around.

It says because the motherboard I have is PCI 2.3 it can't be guaranteed to work, because the X-Fi is 2.1. Is the X-Fi a legacy card? Isn't the PCI spec backwards compatible? Checking out all the forums, it seems this is not an isolated incident, and also that Creative don't care.

Creative has also told me it is my NVIDIA motherboard – but I have an Intel DP965LT!

Should I just take it back and never use Creative again?

Aaron Sanderson

O Creative has a long and glorious history of making sound cards that Just Don't Work with various hardware configurations.

Creative is not the only company that's made expansion cards with issues, of course, and the fact that it is the leading sound card brand no doubt magnifies the problem. So many people buy

Creative products that any possible defect one of them might have is likely to be experienced by many users.

This, though, is no excuse for the sheer *number* of defects that Creative not only allows into retail products, but then fails to fix with BIOS and driver updates.

People have been complaining about X-Fi's making breakfast cereal noises for well over a year, now. I think Creative has patched *some* of the problems with updates, but many clearly still remain, on a variety of hardware platforms and not just the nForce/SLI/whatever systems that

Creative has mentioned.

The PCI compatibility thing is particularly stupid. The only time there should be such problems is when a newer PCI slot can't deliver the voltage an older card needs. PCI allows cards to be keyed to prevent them from even plugging in when there's a problem like this. If a card can be plugged in, it should therefore bloody work.

I recommend you take the thing back, and get yourself a card from a company with a better ratio of marketing to actual firmware/driver development time.





ATOMIC HOTBOX

The best reader-submitted custom made boxes every month



HOTBOX

Welcome to Hotbox! Each month you'll find the winning Hotbox of the month and runners up as voted for online at www.atomicmpc.com.au. Want to win? Submit your box now!



**hotbox
OF THE MONTH**

Chris' Funky Cube

It all started with buying a BFG 6800GT a while ago, as soon as I saw the heat pipes and cool fan shroud with glowing blue fans I knew I had to show this beauty off! But then I thought: 'Hmm, everyone has a window in their box, how can I go further!'

So I began to look at acrylic cases, and



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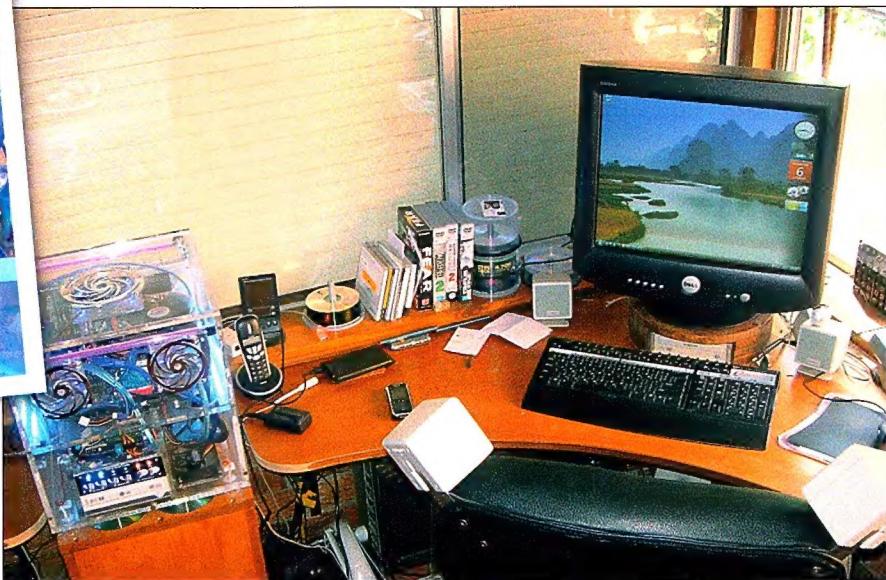
- ▶ 6-12 high resolution, well-lit, pictures of the inside and outside of your case.
- ▶ A 500-word description of how you made it, the obstacles you overcame, the tools you used, and your inspiration
- ▶ A detailed list of the machine's specs. Include CPU, video card and RAM.



realised how little imagination people had! While there were a number of acrylic cases out there they were just metal cases made of acrylic. Boring!

So for my first ever case mod I went the whole way, a completely custom-made cube of 10mm acrylic with as many glowing blue flashy bits as I could find!

Chris



technical details

CPU Intel P4 3.6 Ghz

Motherboard Gigabyte 8IPE775 Pro

Video BFG 6800GT

RAM 2GB

Extras

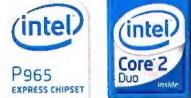
- Zalman CNPS7000 AICu
- 4x 80mm & 2x 12mm SilenX fans
- Dual-boots Vista & XP Pro
- Dell 21" P1130 monitor
- ZBoard keyboard
- Creative Audigy
- Logitech G5



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Try and try again

Logan Booker wants to play a game.

Let's play again,' Brad said.

My hand was on the power button of my PC faster than you could say 'gender reassignment'.

The event placed, rather suddenly, a full-stop at the end of the sentence of the paragraph of the story that marked my first day playing the world's most popular MMO, Grinder, as well as my first breath in at least 10 seconds.

It was a story I planned to roast on a massive bonfire in depths of Hell, cackling madly as I flayed my fingers on the fiery edges of my collapsing sanity. And collapse it almost did, like a house built of wicker chairs and molten crap.

I planted my face on my keyboard and bawled louder than a dog at a butcher's shop window, if dogs were the type of animal that dug emotional blackmail as well as holes.

Bradley decided he was going to role a shapeshifter, because 'they were *rad* in Dungeons & Dragons'. He couldn't really figure out where to spend his character points and dropped them all into 'Transform: Basketball', because he liked the idea of people being able to... play with him.

Worst of all, he chose 'Halfling' as his race. He assured me that midgets with basketball

shifting – or 'migballs' as he called them – would undoubtedly be in high demand.

I went for something slightly saner – a human fighter – and put all my character points into 'Improved Smashy', which I read on the Grinder forums makes you hit things harder. It sounded like the right thing to do. In hindsight, those points would have been better spent buying crumpets or chocolate or even sharp rusty things with which to sodomise myself.

Characters made, Bradley and I clicked 'Accept' and seconds later we entered the world of Grinder. Our avatars faded into existence.

A large but empty field greeted us; bundles of yellow grain and green fronds of various plants glittering dully in the golden hue of the noon sun.

Honestly, you could almost hear the gentle, calming lull of the false sense of security circling like a carrion bird above us.

I appeared first, a codpiece and a rather sad looking sword my only possessions. Bradley quickly followed, and to say his appearance would strike fear into the black hearts of the game's most fearsome demons would be an understatement. Only when his tiny bald head, sunken yellow eyes, gnarled nose and horrible deformed mouth coalesced into being – only then

did I realise the full extent of his vulgarity. Like my character, he was clothed in a codpiece and sword, only emphasising the barely mentionable horror.

'Dear god,' I typed into the chat box, 'what happened to you?'

A few uncomfortable moments passed.

'What do you mean?'

'Isn't it hospital policy to push babies like you back in?'

His character did a quick spin on the spot as Brad examined what could only have been the result of a union between man and wombat.

'Jesus... I need stay off the spirits.'

'What've you drinking? Brake fluid?'

Before Brad could answer, the empty field suddenly became less empty. More like completely full. Of wolves... angry, hungry wolves.

It was clear they wanted to maul our faces... well, maul mine and chew on whatever was left of Brad's.

'Here's your chance to do humanity a favour Brad. If they can get past the taste, that is.'

'I'm all cartilage anyway. Like a shark.'

Brad didn't give me a chance to question his odd reply. With a puff of smoke, a cloud of sparkling dust and a flash of brilliant, white light, his grotesque little avatar morphed heroically into an orange rubber ball.

He bounced twice on the spot before rolling ineffectually under a nearby tree.

'That was rad, Brad.'

'Rhyming is fun.'

With that, the wolves attacked and anything else he may have typed was lost in a flurry of growls, barks and girly screaming. We didn't last long, even with my Improved Smashy. Brad somehow ended up in the tree, but couldn't figure out how to change back into a Halfling which, in retrospect, was probably a good thing. After a minute or so he rolled from his perch and seconds later the field was decorated in torn pieces of orange rubber.

The ghostly forms of Brad and I floated above the carnage. Brad, who was unfortunately no longer a basketball, slowly turned to face me while I did my best not to vomit in my lap.

'You know what we should do...' he typed.

The rest is flaming history. ☺

NEXT MONTH



Build your own inexpensive gaming PC

Let's face it – computers can be costly to make. Especially ones geared for gaming. Lucky for you, *Atomic* knows the right parts to buy so you can get the best from your machine without spending a bundle.

Windows Vista tweak guide

XP is out and Vista is in... except all those great little tweaks you knew from XP don't work too well in Vista. We set Ashton Mills on the case to compile some top tips for Microsoft's new operating system, so you don't have to start from square one.

Sub-\$1000 gaming LCDs

Yes, they exist! Craig Simms went to the trouble of tracking them all down and giving them a good benchmarking. With the arrival of Supreme Commander and dual-screen/widescreen gaming, you really can't go past this round-up.

The Darkness

From Starbreeze, the makers of *Chronicles of Riddick*, comes this creepy next-gen title for Xbox 360 and PlayStation3. We chat with the developers and find out everything from the story and awesome technicals to the really scary bits.

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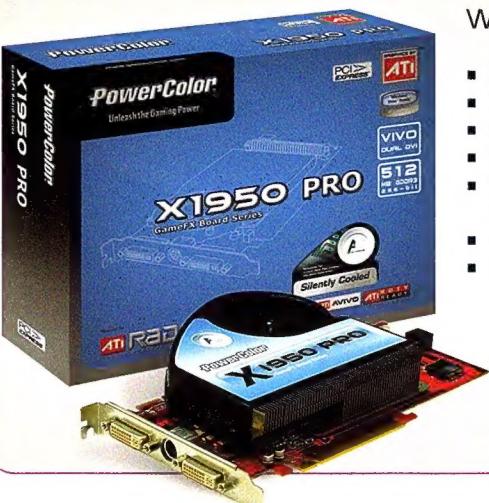
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"PowerColor did a good job making a silent card that runs rather cold that will run fast most of the games you can buy today. It is a mainstream card that I can recommend." Fudo, the Inquirer

"... I honestly did not expect this kind of performance! And as long as the price is right, this card can outsell a lot of other cards and it will." Hilbert Hagedoorn, Guru 3D

"...it really shines when placed besides its price rival from NVIDIA, the GeForce 7900 GS." Vincent Chang, Hardware Zone

"PowerColor's ATI X1950 Pro-based card is an excellent add-in all around, with plenty to offer considering its very competitive price point." Lars-Göran Nilsson, Reg Hardware



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